SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

No. 1899.—Vol. XLII. LONDON, SATURDAY, JANUARY 13, 1872. {PRICE ..... FIVEPENCE. PER ANNUM, BY POST, £1 4s.

Original Correspondence.

IRONWORKS AND COLLIERIES IN YORKSHIRE.

THE ALBION WORKS, WAKEFIELD.

The progress made in the invention of machinery for doing away with the most laborious part of the manual work in coal mines, as well as in that for the production of textile fabrics, and for various other purposes, will be seen at few places to greater advantage than at the Albion Works, Wakefield, now in the occupation of Mr. F. Hurd. They are situate on the western verge of the town, not far from the well-known prison, and have recently been considerably enlarged by the addition of a building formerly used as a dye-house, and nearly 100 yards in length. Passing from the offices, we enter the principal room, well fitted up for the turning out of every description of machinery, there being a number of lathes, drilling, planing, slotting, and other machines, all in active work. In the room were several patented engines and machines, all of Mr. Hurd's invention, some completed, and others in course of construction. For a young man, it may be said Mr. Hurd has been very prolific and successful in the bringing out of novelties in connection with machinery of the most diverse character, which he has secured by patents, and all of them displaying great originality of resource and power in overcoming apparent difficulties and complications. Amongst those which have been alike successful and profitable may be named Hurd's coal-cutting machine, patented towards the close of 1869, and since then greatly improved. So highly, indeed, was the machine thought of, that shortly after it was brought out Mr. Hurd sold half the patent right for 3000*l*. The invention, in the first instance, consisted of a series of link stocks, containing cutters, joined together in such a manner that neither rivets nor connecting pins were required. The cutters passed around a pulley mounted on a radial arm provided with grooves to support the back of the cutter-stocks, and prevent them from being drawn out of the radial arm. In the following year, 1870, the machine was greatly improved by a patent taken out in the names of Messrs. Firth and Hurd, by which the cutters were connected to an endless rope, instead of being fixed to the links of a chain, as in the first patent, the rope being driven by a friction-pulley with wedge-shaped segments fitted between discs on a central circular wedge; also in supporting the endless wire-rope and cutters, or an endless chain of cutters, by the application of flanged pulleys to the radial arm.

That the invention of the two gentlemen named can be adapted to any seam of coal was pointed out to us most conclusively by Mr. Hurd whilst we were going through the machine shop. A complete coal-cutter of considerable power, but of comparatively small dimensions, having just been completed. It appeared to be less than 2 ft. high, with revolving clips for clipping the rail, and propelling the machine. The cylinder was 3 in. in diameter, the entire length only 4 ft. 3 in., and the width 2 ft. 7 in. The total weight of the machine did not exceed 4 cwts., and the rails required for it would be but 19½ pitch. Such a machine appears to be well adapted for working some of the seams such as are found in different parts of West Yorkshire, where as much as from 4s. to 5s. per ton is paid to the collier in beds under 2 ft. in thickness, being principally valuable for smelting purposes, and being raised in connection with the ironstone. At the present time where the machines are at work something like 8 yards on an average are being cut per hour to a depth of 3 ft. or better. Some of the machines have been made to be worked by hand, and very neat they look, but they are not likely to take the place of those worked by compressed air, for they are not exactly the thing that an ordinary collier used to the pick would take to with anything like "affection," the work being rather monotonous.

A good deal of pneumatic machinery for working coal-cutters, and for other purposes, is also being made at the works on the principle patented by Messrs. Firth and Hurd, by which it has been found that 18 lbs. of steam in a 17-in. steam-cylinder will produce 65 lbs. of air with a 22-in. air-cylinder. The invention, however, has recently been fully described in the *Mining Journal*.

In the works were also being made an engine known as Hurd's Patent High Speed Reversible Engine, in which neither tappets, cams, or eccentrics are used, so that it is more effectual, and at the same time more simple, than the ordinary engine, whilst the cylinder can be either fixed or oscillating. The engine is being used most successfully at many places, being adapted for any description of work. It has been for some time advantageously used in the Leeds district at the ironworks in working Blake's well-known stone-breaking machines. The engine is very compact, takes but little room, and forms its own foundation.

In the same department is a machine made for the purpose of working the Rhea plant, grown in great profusion in India, and being something similar in fibre to the China grass, and alike capable of producing cloth of a silky and tough character. The Indian Government, alive to the importance of cultivating an article likely to be of such great importance, some time since offered three prizes, of 5000*l*., 3000*l*., and 2000*l*., for the machines best adapted for the manufacturing of the cloth from the substance named, and Mr. Hurd is one of those who have entered the lists. At the present time the Rhea fibre is extensively used by the natives for the making of ropes, nets, and similar products, being superior for those purposes to hemp. The plant is known in most parts of the East, and is being successfully grown in the Punjaub and the lower provinces of India. The great drawback hitherto to its introduction into this country has been the cost of taking the fibre from the bark by hand, and the expense of getting it ready for Europe in its comparatively rough state. Were there the necessary machinery for making the cloth in India, there is very little doubt but what it would become a valuable article of commerce from the East to all parts of Europe, as well as to other countries. We were shown by Mr. Hurd some of the material woven by his machinery, and were not a little surprised to find a fabric which bore a gloss finer than alpaca, and almost equal to fine silk.

Another of the specialities of the Albion Works pointed out was a sugar-breaking machine, by which an almost unlimited quantity of sugar can be made "small" in a very short time. The sugar can be broken into any size desired, and the machine is so arranged that the smaller particles made in cutting are separated from the larger ones, and both are conveyed to bins or hoppers placed for the purpose in any direction. The whole of the work is done by one person, who can so arrange the machine, without any previous knowledge, as to cut in any direction, or to any required size. Mr. Hurd is also busily engaged in the production of worsted and similar machinery, for which there is a large demand in the district.

Not far from the machine shop is a rather extensive foundry, where all the necessary castings are made, and for which there are all the used appliances. There is also a blacksmiths' shop, model room, engine room, &c.

An arrangement of the boilers in connection with the engines has just been made by Mr. Hurd, on an entirely new plan, the ordinary mode being reversed. The system has worked so advantageously that it is proposed to make it more generally known, and we purpose on a future occasion to enter fully into the details connected with it, believing that anything calculated to save labour and economise fuel in connection with boilers cannot be otherwise than important to manufacturers, proprietors of mines, and many others.

The new premises, opposite the old works, are now fitted up with every description of engineering tackle, including slide and surfacing lathes, screw-cutters, drilling and slotting machines, &c. In one part of the place are stored several coal-cutting and sugar-chopping machines, and one for the dressing of the East Indian fibre. For the working of the slotting and other machines, and as showing that air is a more economical motive power than steam, Mr. Hurd is preparing an air-compressing engine for that purpose.

The last invention patented by Mr. Hurd is one of more than usual importance, being for the construction of main pipes for air, gas, water, and other purposes. The grant is dated Dec. 19, 1871. The object, we believe, is to lay down main pipes in streets at the surface, so that they may form the permanent roadway or pavement, and a vast saving would be effected in various ways. With air-pipes, in particular, Mr. Hurd considers he could supply that power much cheaper to manufacturers than they are now paying for steam. He also proposes to bring air as a motive power into use in many ways, and is very sanguine that his views will stand the test of practical investigation—which he invites. We can only express the hope that inventions, which it can be shown will really effect a saving in the expenditure of coal—an item of no inconsiderable importance—in the economising of human labour, or that will in any way tend to lessen the loss of life of those engaged in mining or other dangerous occupations, will not only be adopted, but ensure to the inventors the reward they will be justly entitled to. Important changes, however, must be effected with great caution, and only when success is insured by the most infallible test that can be brought to bear upon them; after standing such a test, however, it is to the interest of the community that no consideration should be allowed to stop the progress of science, by which all are benefitted, more or less.

VENTILATING COAL MINES BY STEAM.

They were at once important and interesting experiments that were made on Saturday last at the Lower Moor Colliery of Messrs. Mayall and Seddon, at Oldham. The experiments related to the invention of Mr. G. L. Scott, of the Crown Ironworks, West Gorton, who has patented a new steam colliery ventilator. In this new apparatus the steam is made to act by induction directly upon the atmosphere with which it has to deal, and not through the intervention of any engine or other mechanism. It consists of 72 vertical cast-iron pipes, each about 5 ft. long and 7 in. internal diameter, and formed with a bell mouth at the lower end. These are placed upon and fixed to some suitably perforated iron plates, forming a cover over a brick chamber built close to the top of the upcast-shaft, and communicating with it. Each vertical pipe is fitted with a small internal vertical steam-pipe, terminating with a small orifice 3-18ths of an inch dimeter, at about 2 ft. below the top of the 7-in. pipes. The whole nest of pipes occupies a space about 10 ft. square. The steam-pipes for the supply of the jets are carried round three sides of the rectangle which the whole arrangement forms, and are connected with every vertical pipe from a series of cross pipes placed between the rows, and passing from one side to the other. The whole is supplied by one 4-in. steam-pipe led from the boilers belonging to the winding and pumping-engine, which in this case are about 26 yards distant.

The Lower Moor Colliery is being worked at a distance of about one mile from the shaft, which is 296 yards deep. The coal is about 4 ft. thick, and is much broken, necessitating intricacy of working, and much consequent resistance to the ventilating power. This has hitherto been obtained by an ordinary furnace at the bottom of the upcast, producing a flow of between 11,000 and 12,000 cubic feet of fresh air per minute. By the abundant use of excellent coal, and the adoption of other means to make the furnace do all that was possible with a grate of 29 square feet, an average flow of 16,000 cubic feet per minute was obtained on Saturday. The furnace was then left to cool, and preparations were made for starting the new ventilator. This, let us repeat, was placed at the top of the upcast, which was covered and carefully closed by puddled clay, thereby to prevent any leakage when the steam-jets should be set to work. When the ventilation below ground had fallen to 6720 cubic feet per minute the new ventilator was set to work, and very speedily the ventilation had run up to 16,800 cubic feet per minute. Subsequently five other measurements were taken, and an average of 22,792 cubic feet shown to have been obtained. Assuming that the apparatus had the benefit of the previous operation of the furnace, and deducting the whole of the 6720 ft. from the average current, we have 16,072 ft.—an increase upon the results of the use of the furnace, even when exceptionally fired, as we have indicated.

We have not ourselves seen the ventilator, and we are now recording what it has done simply as a piece of trade news—the result of particulars independently gathered during the experiments. Our readers will, however, see that, by what we have set forth, this ventilator is a simple affair, and it will, therefore, strike them as more likely to prove of service to the colliery proprietor. The account supplied to us appears correctly to describe that the action of the steam-jets in the vertical pipes appears to be simply that of a continuous fluid piston moving upwards with a very great velocity, and thus sucking out the air; but its true theoretical principle involves, probably, a totally different action. The speed with which the steam issues varies according to the pressure in the pipes, which in this case was only about 38 lbs. per square inch, though constructed to use 70 lbs. if needed. The latter pressure would vastly increase the ventilating power. No attempt was made in this instance to find out how great an effect could be produced by the ventilator, the inventor having been requested to supply such an apparatus as would produce the same effect throughout the mine as that caused by the furnace as usually worked, and no more.

We trust that Messrs. Mayall and Seddon will find their new ventilator continues to supply them with the excellent results which attended its experimental working on Saturday. Should this prove to be the case—and we have no reason to suppose that it will not—then colliery proprietors have in Mr. Scott's mechanism a means of securing ventilation that in many ways will greatly promote the coal interest of this country. It is believed that its use would enable coal that yet remains in pits which have been closed down to be got without the risk to human life that it was supposed necessitated the abandonment of the workings. And it should strike everyone that the use of such a ventilator will be unaccompanied with dangers that threaten the application of furnace ventilation; whilst the ventilator being upon the surface it may be fairly supposed to possess advantages in the matter of working that do not attend a ventilator in the pit, although we can fancy it quite possible for colliery engineers to suggest difficulties to the ventilating power being upon the surface that are not observed in connection with, perhaps, an equally good appliance at the bottom of the shaft. Here, however, we have a piece of machinery which Saturday's experiments show is capable of accomplishing much that mining managers desire, and at less cost and less risk than is inseparable from some other methods upon which our colliery engineers depend for their indispensible air current.

MINERALOGY.

METALS:—THEIR HISTORY, CHEMISTRY, GEOLOGY, PHYSICAL PROPERTIES, USES, AND COMMERCIAL IMPORTANCE.

Sir,—With your permission I propose, in a series of papers under the above heading, to devote a few evenings during the season peculiarly that of intellectual improvement to string together a few notes, the accumulation of a long series of years. If they afford a tithe of the pleasure to the readers of the *Mining Journal* in glancing them over they have to me in collating, my object will be gained. My utmost endeavours will be to render them instructive and useful, and worthy of the organ through which they will be promulgated. I feel satisfied they will prove not void of interest, and, perhaps, they may lead to a more extensive pursuit of the subject treated upon, and to a development of thought on the part of many juvenile branches of the families of your numerous subscribers. It is, in fact, to these I would be considered more particularly to address myself. The youth constitutes the future man. To him his country has to entrust her position, not only as a mineral producing and utilising state, but for the supremacy she has hitherto sustained in those respects.

The battle will be an obstinate one, and contested with all the ardour which an army of veterans, flushed with unexampled successes, can exhibit against comparatively undisciplined troops, many of whom have been trained amidst themselves, and possessing the like equipments and skill. Not only is the great American continent already made to yield, by the expenditure of labour and capital, chiefly, or at least to a great degree, the offspring of England, treasures hitherto lying dormant for lack of necessary skill and other appliances, but vastly inferior regions nearer our own shores, are beginning to appreciate the true source of Great Britain's prosperity—the gifts of a Creative Providence, whose unsearchable wisdom hid the riches of the earth that they might be discovered and drawn from the bowels of the earth by the highest exercise of the ingenuity and perseverance of man. Germany, Turkey, Russia, Spain, Italy, and Portugal—all appear to have suddenly, and as it were spontaneously, sprung into activity in the race. Ireland alone, with shame be it spoken, appears to remain in a state of lethargy, in comparison with her capabilities. Rich beyond every other section of the British possessions, she appears, by the limitation of her exertions, insensible to her mineral resources, and still she has not lacked the counsel of the wisest of her people.* On the causes of this lamentable apathy it is not my province to dilate; it is sufficiently grievous to have to record the fact. France again, paralysed, no doubt, by the late disastrous turn in her military position, and suffering from the more recent exhibitions of her internecine quarrels, appears not to take advantage of the opportunities afforded by the stimulus accorded of late in such an unprecedented degree to mining enterprise. Here, and allow me to say I speak of personal knowledge of the localities, the schistose chain of the Pyrenees abounds in zinc in every sort of combination with sulphur and oxygen which may be worked at light cost in labour, and, with a well-organised system of roads, cheap transit to the sea coast, whilst the most majestic range of the granitic Alps abounds in nearly every kind of ore, including gold, silver, platinum, nickel, and cobalt, with unusually ready means of exportation to every quarter of civilisation.

Hitherto, it would appear, the supply has equalled the demand. Now the reverse obtains, and, what is more than probable, this healthy state is likely long to prevail. Very many excellent projects have been and are still being floated. "The cry is still they come," and yet there is room for more. Necessarily there are and must be some failures. Professionally I have been consulted upon several which have been crushed in the bud. Of these the public receive no notice. At the same time I have experienced much gratification in being able to record favourable opinions of many that, were it not for the impetus given in the present emergency, would never have been accredited as "safe investments," or even considered worthy of an adventure. I must apologise for this I trust not inopportune divergence from my subject. In pursuit of the task I have allotted myself I will at once commence with the subject of—

Iron.—This metal is primarily selected in consequence of its influence upon the prosperity and happiness of mankind. It has held the most prominent position in all ages in relation to the arts of peace and war—in the progress and practice of civilisation. For the earliest records of its existence and use we are referred back to patriarchal epochs, and there we find one to whom "the Brethren of the Mystic Tie" attribute the greatest credit as a benefactor of the human race—Tubal Cain. In Holy Writ he is spoken of as an instructor of every artificer in brass and iron. Not only was he a worker in these metals, but, according to the original language, which was very expressive, he instructed in the employment of edged tools

* In that admirable work of Sir Robert Kane, "The Industrial Resources of Ireland," is presented every inducement for the greatest activity in mining operations.

which he fabricated. It is more than probable that this highly gifted individual was himself impersonified by Vulcan, of heathen mythology. His memory must have lived and been held in the deepest veneration by many successive ages, and would doubtless have given rise to his deification and the consecration of those temples and other stupendous monuments to his honour which, erected in the Cyclopæan era, now, as vast mementos of early civilisation, by their ruins excite the astonishment and stimulate the curiosity of the modern traveller. Further references occur in Scripture to iron. In fact, they are too numerous to quote. I shall confine myself to a few of the most striking. Moses, learned in all the wisdom of the Egyptians, held out as an inducement to the Israelites to persevere in their toilsome journeyings to the promised land that it was one "whose stone are iron, and out of whose hills thou mayest dig brass"—(copper). Iron in its pure state being much too soft to be applied to the various purposes of agriculture, domestic economy, and warfare, it must have undergone certain processes to render it suitable. Again, native iron being found in exceedingly rare instances, being almost universally associated with oxygen, sulphur, and other foreign matters, it demands the exercise of the utmost ingenuity to separate the metal from its ore, an ingenuity, in fact, which far exceeds that of the separation of gold, silver, tin, or copper from their impurities. This object being effected exhibits the wonderful state to which the chemistry of metals, or otherwise metallurgy, had advanced in the very earliest state of the world's history, and collaterally with other evidences of the skill displayed at this period tends to confirm the words of Soloman "there is nothing new under the sun." *Au revoir.*

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WITH WHAT ARE THE STRATA ABOUT PRODUCTIVE COPPER LODES MINERALISED?

SIR,—The question heading this paper seems to have attracted considerable attention, but hitherto without any apparent beneficial results. This may have been from the vague and indefinite nature of the question itself. The term "mineralised" is a somewhat comprehensive one, and embraces a variety of things, and the sense intended by its use in connection with strata in subserviance of metalliferous deposits ought to be clearly defined previous to the discussion of any question relating thereto.

The meaning of the term "mineralised strata" I conceived to be very different from that intended to be conveyed when applied to other mineralised substances—the metals themselves, for instance, which are mineralised in the one form in which we find them. This is said to be produced by chemical association with other bodies. Petrifactions also are mineralised substances; the tissues of animal and vegetable matter are either destroyed or converted into minerals by being impregnated with mineralising substances. Waters are also said to be mineralised when they contain mineral ingredients in a solvent condition. But the sense in which I apprehend the strata to be mineralised is altogether different from the above, and, indeed, from the sense and significance usually ascribed to the term.

Mineralisation of strata must mean, and can only mean, its impregnation by metallic particles in one form or another, mechanically and not chemically combined, and, therefore, may be extracted therefrom without the rocks undergoing dissolution. It is a remarkable fact that whilst the several earths which enter into the composition of all rocks are themselves the oxides of metals, they should be at the same time the prolific source of all the other metals, which are in no way essential to their own identity and being.

I do not see what necessity there is that the practical mining engineer should be an accomplished analytical chemist, as he must of necessity be to make correct quantitative analyses of all the rocks comprising the metalliferous belts, as some of your correspondents seem to think from the way they express themselves on the subject. And if it were ever so desirable, or even necessary, there is no probability of its ever being realised, since the time necessary to qualify a person as an accomplished analytical chemist would leave him but very little time to qualify for the equally arduous duties of mining. Further, one would be almost led to conclude that it was believed by many that an analytical examination of the strata would, of itself, be sufficient to determine the value of the lodes contained therein, independently of any examination of the composition and general properties of the lodes themselves. If such be the case, a grosser error can scarcely be entertained. There is no single condition that I am aware of sufficient to justify such a conclusion, short of the actually ascertained value of the lodes themselves, and that can only be arrived at by their development. In the ordinary way of estimating the value of lodes prospectively a number of conditions are regarded, familiarly known to most experienced mining engineers, and, therefore, I need not now stay to enumerate them, but will simply say that, prominent amongst others, the character of the country rocks hold a conspicuous place. And why, it may be asked, is this the case if the convictions of those engaged in mining were not that the character and value of the lodes were determined by the nature and composition of the rocks in which they are found? This, it must be admitted, is a very strong proposition, and one the truth of which, within certain limitations, is incontrovertible. But it has its limitations, and beyond that is vulnerable on all sides. In taking our stand on the truths contained in this proposition as a pedestal, nothing is more natural than the desire to ascertain of what ingredients the country rocks are composed, as a "basic" fact upon which to theorise or reason respecting the probable value of lodes contained therein, and which are as yet undeveloped. But this, I fear, is one of the plausibilities doomed to give place, beyond certain very qualified limitations, to facts which will admit of no compromise. I have stated in a former communication to the *Mining Journal* on this subject that the strata and also the water of some poor mines contain a greater percentage of copper than those of many rich mines, and these are facts which have a very appreciable bearing and influence on the question we are considering. In investigating subjects like this, it appears to me best to do so with reference to its practical issue, and, in consonance with this view, it may be proper to ask is it necessary to a due appreciation of the quality of any stratum for the productiveness of lodes contained therein to be informed of the several ingredients, and of what quantity of each, it was composed? I submit, with all deference to the judgment and experience of others, that it is not. To illustrate what I mean, it may be necessary to add—If search were being prosecuted for copper, and the evidences of its presence in the lode itself were not very impressive, yet at the same time it was found by analysis that the surrounding rocks contained the several ingredients in due proportion known to constitute those of the richest mines, with but the single exception of copper itself, no trace of which could be found, would the approved uniformity of the composite character of the rocks in all other respects compensate for this single deficiency—the absence of copper—and operate to stimulate and sustain confidence in the ultimate success of the enterprise notwithstanding? I am decided in my owu opinion that it would not, but that every presumption founded on such a basis would be considered untenable. Of course, it is to be clearly understood that these remarks are intended to apply to stratified rocks only, and those in which the known favourable auxiliaries to the deposition of metalliferous deposits do not exist, such as cross-courses, slides, faults, elvans, &c. On the other hand, would the presence of copper in unusually large quantities in the strata have the effect of establishing one's confidence in the success of an enterprise if there were a remarkable absence of that desirable commodity in the lode itself? I am aware that this is a very delicate, yet at the same time equally strong, way of propounding a highly important question, one which will admit of no other than a qualified answer; yet it is pertinent to the issue, because such a condition of things exits, and mining enterprises are largely affected thereby.

We are well aware, all other things being equal, that a better ground of hope exists under these circumstances than if there were an entire absence of metal from the strata as well as from the lode, yet cannot refrain from saying it might eventually be found of that class which maketh the heart sick. I have not the least doubt but that there is a stage in the progress of the metals when they are widely diffused, and another stage in which the achme of their concentration and development is realised, and that between these two extremities a regular gradation from the lowest to the highest extends, and *vice versa*, from the pinnacle of the perfection of their nature downwards again to dissolution. There is no halting in nature—no suspense, every achievement denotes a change, which in its turn becomes a part and the necessary precursor of other changes destined to succeed and proceed from one to the other, *ad infinitum*. It is quite possible from this view that many lodes may be attacked by the miner long before their growth and mature development are complete, in which case the metals can only be supposed to be, to a very important extent, diffused through the country rocks, both contiguous and remote, and in such condition and at such stages can scarcely be supposed to be mineralised, as that would imply chemical association with other bodies, of which no trace of evidence, so far as I have ever seen or heard of, exists. But there are evidences of the existence of the metals in the most simple condition of their nature mechanically combined with the rocks; and as their existence in any form implies design, and a purpose in connection with mankind, and as no useful purpose can ever be subserved by them in their present condition, it is to be presumed, if more direct evidence were wanting, that the metallic particles, so sparingly diffused through the rocks, are destined eventually to congregate and consolidate in fissure veins and other kinds of deposits.

I have already exceeded the limits of an ordinary letter, and that prescribed to myself at the commencement of this, still my argument is incomplete, and many thoughts suggest themselves to my mind; I have, therefore, to beg the favour of being allowed to continue my remarks in another communication. ROBERT KNAPP.

Ellsworth, Nye county, Nevada, Dec. 13.

THE "UNIT" OF COPPER ORE.

SIR,—I shall be obliged if one of your correspondents will kindly inform me what is meant by the "unit" of copper ore; how it is arrived at; and how the "unit" affects the prices or values of copper "ore" and "fine" copper per ton—in other words, what is meant by "17s. 6½d. per unit?" I should also be much obliged if someone would inform me what the "standards" for tin ores are. I know that the smelters fix them periodically, but I want to know upon what the calculations are based, as it appears to me the "standards" are variable bases of calculation, formed upon no other theory than the whim and fancy of the combined smelting-houses. J. T.

Wiltshire-road, Brixton, Jan. 10.

THE PRICE OF COPPER.

SIR,—Seeing the difference of opinion respecting the probable course of copper, I am induced to ask you to insert the following remarks in next week's Journal.

Copper, like everything else, must be subject to the all-powerful rule of supply and demand, and it is well known to all who have had to do with the article that its price ruled during the lifetime of anyone who has had transactions in it (until within the last four or five years) at considerably over 100*l.* per ton, and then it had to give way to the greatly increased production from rich mines in Chili, far exceeding the consumption—to such an extent that enormous accumulations of stock, both here and in Chili, drove down the price to a rate hitherto unheard of. The consequence of this was that the miners, all the world over, "picked out the eyes" of their mines, and the reaction from this state of things is now being felt in a greatly reduced production, both in Chili and Cornwall, with, at the same time, the heavy stock which has so long weighed down the market, less than one-half of what it was a year since.

What, then, is the present position of the article? A consumption which has reduced the stock 10,000 tons in the year 1871, with the probability of its continuing at this rate for some time. The present stock almost entirely in the shape of foreign copper, the quantity of ore and regulus being, from what I gather from brokers' circulars, under 2000 tons, and the certainty that the English smelters must purchase largely Chili bars and other foreign copper to enable them to carry on their business. With these facts before us, can it any longer be a matter of surprise that the price has advanced 25*l.* per ton from the lowest point; and seeing it is now much below the average of years when supply and demand ran "neck and neck," may it not reasonably be expected that a further advance will take place? I gather also from the circulars that the Indian demand for some time past has been very small, and the French much below its usual quantity. If, then, these two important markets should require a supply during the current year, is it not probable that we may see the price advance to its old point of 120*l.*? Being interested in tin as well as copper, I well remember a smelter, with a knowing nod of the head, saying the price of 75*l.* for tin was with difficulty maintained, and shortly after an advance began, and went on till the 75*l.* became 150*l.* And why not, I ask, the same thing in copper, since the same rate of supply and demand governs it?

I am aware it is said the smelters did not not foresee the advance; and so keep up their stocks, and, therefore, will try to keep down the price, but could the tin smelter keep down the price? No; for they, too, must bow their heads to the little rule of supply and demand. There are many things beyond the control of them, and many men have yet to learn this.—*Jan.* 10. A MINER.

THE COPPER TRADE—THE LORDS.

SIR,—My prediction repecting the price of copper during the last two or three years has been fulfilled during the past month or six weeks; and I believe that copper must go very much higher in price, from the circumstance that two-thirds of all the copper mines in the world have ceased to exist, owing in a great measure to the depression in the price of the article. Many of the most celebrated copper mines were compelled to produce all the ore it was possible to raise to keep the mines afloat as long as they could, but the long-continued depression in the price of the article caused the greatest mines to give way at last. To open up old and deep mines is a time of years, and in most cases requires a very large amount of capital. The stocks of copper are considerably reduced, we are informed by statistics in the various publications, and the demand increasing. As a general rule, when prices are very low consumers invariably run their stocks very low also. Mines in Chili, as well as in other countries, have become exhausted, and new mines must be found, and when discovered roads or canals have to be made to take the ores to market; this is a work of years in most instances—one extreme invariably produces another

Now is the time for the landowners to act a little more liberal, and encourage capitalists to invest a portion of their capital in British mines, which, on the whole, pay best in the end, and not attended with half the risk; but reckless concoctors of public companies prefer bringing out something foreign, on account of being able to charge 20 times the premium for the property they introduce, and the investors have no means of judging as to the value of the property offered them but by reports. Gentlemen are sent out to inspect and report on properties they are totally unacquainted with, and the public are invariably misled. Because it is a foreign affair it must be good, but the last 10 years a different tale could unfold.

Jan. 9. A. BENNETT.

THE MINERS' WAGES MOVEMENT.

SIR,—The present agitation in Cornwall for the disarrangement, if not the upsetting, of the recognised and established rules by which the general affairs of mining are conducted, simply because the miner wants a few shillings per month extra wages, appears to all who are really interested in this branch of national industry as something really preposterous. Led away by the wild, unfortunate notion of a few idlers, and aided by a well-known class of tradespeople, whose dealings under the late bankruptcy laws were of a somewhat dubious character, the miner some few years ago was tempted to strike in the eastern part of the county, but finding that mining, unlike any other enterprise, admitted of an agreement between the different proprietors, and that the stopping of mines, nine out of every ten of which were not paying cost, was rather a gain to the proprietary than otherwise, the attempt failed, and work was in only a few days gladly resumed.

Remembering these facts, I would now caution the steady, industrious miner against being again deceived, and I would, at the same time, lead him to believe that those who, by the expenditure of their capital, were the means of giving employment throughout the county, have, after all, some little interest in his well-doing, and are, perhaps, just as likely in the long run to prove his real friend as some of those correspondents who in the local press have of late been assuming so much to the contrary, exhibiting, at the same time, such want of knowledge of the practical details of the subject on which they have been writing as has seldom been equalled in any public controversy.—*Jan.* 10. VIATOR.

FIVE-WEEKS MONTHS.

SIR,—I have read numerous letters on the subject of five-week months, its abolishment in Tincroft and Carn Brea Mines by Capt. Teague, and the great benefit said to be conferred thereby on the miners. I am at a loss, however, to discover in what way the payment of miners 13 times in the year instead of 12 will benefit them. The change in the system will give every man engaged at a fixed monthly salary an extra months pay in the year, and that is the extent of the benefit. But to the tributer or tutwork man I contend it makes no difference, as to the amount of their earnings, whether they are paid 12 times or 20 times during the year. Give men always a fair price in sight for their work, without reference to the preceding month, and then if they work five weeks they will earn one-fifth more than in four weeks. Where, then, is the hardship of a five weeks month? I have for over 30 years made it a rule to give men a fair price in sight and extent, always for the month. I have often set 10 fms. in a shaft in one bargain, and with fair-play to employer and workmen five weeks or four weeks is quite immaterial. Again, if surface people work four weeks I pay them for 24 days, and if they work five weeks I pay them for 30 days. So where is the pretended benefit to the people in paying them 13 times instead of 12 in the year?—*County Cork, Jan.* 8. A MANAGER OF MINES.

ON NEW JOINT-STOCK MINING COMPANIES.

SIR,—In the midst of the excitement at present attending the constant discovery of fresh deposits of the precious metals in Western America, it may not be unprofitable to recall what took place under similar circumstances upon the discovery of gold in Australia. Then, as now, mining companies were formed in this country with capitals which then appeared enormous. Although small compared with the present scale, and dividends of almost fabulous amount were promised to those who would take shares, I need not say that these promises proved delusive. Among the promoters and managers of companies some were, no doubt, honest and over sanguine; others self-seeking, most incompetent, and the money so eagerly supplied by confiding shareholders brought no return. Yet the Australian fields were no less richly charged with their precious freight than are these new regions in the Far West. Have we, then, in these new undertakings special grounds for believing in a more successful result? A superficial view of the constitution of the companies would scarcely warrant such a conclusion. We see the purchase-money put at an amount which seems very great when we consider the uncertainty to which all mining operations are subject, and when we further consider how little developed, comparatively, the properties were when handed over. Then, the available remaining capital seems too small for such large concerns.

Can we gain more satisfactory data from the reports of the mine managers and experts? I at least am unable to do so. There may be first-rate managers at the mines, but from the reports I have read I should conclude their number to be small. Now, to show the value of a really efficient manager, I will relate what happened in the case of one of the Australian mines above alluded to. As in so many similar instances, a capital of some 100,000*l.* had been spent, and there was so little to show for this outlay that a share on which 1*l.* had been paid was to be got for 2*s.* 6*d.* At this time a new manager was appointed, whose first report I accidentally read, and to my surprise I found it in every respect a masterly production. Every detail of the concern was given in proper order, and every circumstance considered which was likely to affect it. Although this report dashed to the ground the delusive prospects held out by the original promoters of the undertaking, it showed by reasonable inference from definite data that a fair return might still be hoped for on the outlay. I at once bought shares in the Port Phillip Company, and I need not say that I have never repented of my bargains. Mr. Bland's able management having more than realised the results his first report lead us to expect. When I can see a report from a manager in these new undertakings upon the model of Mr. Bland's reports on the working of the Port Phillip Company, I shall give it mature consideration, and shall, perhaps, become in a second instance what I can for once describe myself,

A SATISFIED SHAREHOLDER IN A MINING ENTERPRISE IN FOREIGN LANDS.

"WHAT TO SELECT—WHAT TO AVOID"—No. VII.

SIR,—It is no less instructive than satisfactory to find that, with the gradually improving condition of the metal market, a uniformity of opinion prevails that in importance and extent home mining is gaining a position far beyond anything it has hitherto attained. This is the more gratifying because the time has not long gone by since we were told that Cornwall as a mining centre could only be recognised as a "fact of the past," that its mineral produce could never again command a remunerative value; that foreign mines were able profitably to supply every market, and meet every demand at such prices as to render Cornish tin mines utterly profitless; and as to copper, the illimitable discoveries in different parts of the world left no gleam of hope for Cornwall's copper mines.

Only two short years have elapsed since such forebodings as these were ever being obtruded before the investing public. True, for a time Cornwall's mines passed through a very severe ordeal, during which many succumbed, the remaining few trembling in the balance; but what a total change has ensued, how different every prospect—the produce of our home mines is realising increasing value, copper is steadily and substantially advancing in price, and in face of a considerable diminution in the shipments, and an enlarging consumption, a much higher quotation is all but certain. Tin, too, has attained an unprecedented value, notwithstanding the recent slight reaction, while the market for lead warrants the expectation that still higher prices will rule.

Stubborn, irrefragible facts like these, illustrative of the expanding vitality of mining, should never be forgotten during periods of temporary depression. Mining possesses a vitality inseparable from the material industries and commerce of the world; the additional purposes to which metals are being almost daily applied naturally create a constantly increasing consumption, which must augment proportionately with the development of trade and progress of civilization.

PACIFIC.—This company was originally formed for the purchase of three mines in California and Nevada. The Union Hill Quartz Mine was subsequently abandoned, and the Buckeye Hill Mine was disposed of to the Sweetland Creek Company, leaving the Lander Hill Silver Mine, which is now being successfully worked by the Pacific Company. It is situated near Austin, Nevada, and comprises a lateral extent of 2500 ft. There are two shafts, one perpendicular, and the other on the course of the lode. Within a reasonable depth it is calculated that other productive lodes will be intersected in addition to those at present being developed. The mine is amply provided with machinery, there being a pumping-engine, drawing-engine, two reduction works, steam-stamps, amalgamating-barrels, calcining-furnaces, &c. There can be no disguising the fact that in the interim between the purchase and the taking possession by the company the mine was most unfairly treated, the whole of the available ore having been removed. It has, therefore, taken a long time and considerable expenditure to place the mine in a productive condition. One of its leading favourable features is the exceptional richness of its ores, as may be judged by the fact that when the mine was being actively wrought—which has not been the case since 1869—1030 tons of ore yielded $224,050 (equal to an average of $217, or 43*l.* 8*s.*) per ton.

The present management commenced operations in April, 1871, and the mine may now be said to be in a thoroughly effective working condition. Four new lodes have been discovered. The Metticom Mill has been put into working order, and a new amalgamating process established. The mill commenced working about the last week in November, and during December the mine delivered to the mill ore to the value of 3400*l.* The mill at present is only working

half time, owing to an inadequate supply of wood; but when this has been remedied (which no doubt is the case by this time) increasing profits may be expected. The shares are fully paid (7*l.*), and are at present selling at about 50 per cent. discount.

GREAT WHEAL VOR.—It is satisfactory to find that my anticipations as to the improving character of this once richest tin mine in Cornwall are being fully realised. Every point of operation maintains its value, and as the ground westward is being developed stronger indications are presented of its opening out a mine of great value. I may incidentally remark that I have just received information to the effect that the slight reaction in the price of tin referred to above is of a temporary character, and that a rebound must quickly ensue.

RICHMOND CONSOLIDATED.—By unfounded rumours these shares have been forced down in market value. Every information from the mine is of the most encouraging character. Its resources are being daily extended, and its reserves increased.

1, Pinner's-court, Old Broad-street. FRED. WM. MANSELL.

MINING IN SWEDEN—THE VIEILLE MONTAGNE COMPANY.

SIR,—The zinc and cobalt mines owned by the Vieille Montagne Company are the most extensive mines in Sweden; the Atvidaberg copper mines are also worked on a large scale, employing in the mines and smelting works 2000 persons.

As I stated in my last letter that the former owner of the mines and estates, now in the hands of the above-named company, worked the mines in a small way, and exposed the vast deposits of zinc-blende, since opened so extensively by the present company. For the mines and land I understand the company paid about 150,000*l.*; I may say that they were compelled to buy a greater quantity of land than was required for working the mines, as the dressing machinery is driven by water-power, and to obtain the right of damming up the stream from the lake near the mines, hence the reason of purchasing the land. The mines are situated in a wild and rugged hill overlooking a part or an arm of the beautiful lake Wettern. On a fine day the view is most delightful.

The lodes can be traced over a considerable extent of country; and a peculiar feature in this country is that the ore is generally found, as the expression goes, to make up to the surface, and appears to hold also in depth, as the Old Falu copper mines are 200 fathoms below the surface.

The zinc mines are nearly 100 fathoms below the surface, and immense deposits of rich zinc-blende are found as the lodes are opened in depth. The mines are opened in a practical manner, and well ventilated by fans when necessary, a matter very much neglected in many mines. To enable a miner to do a good day's work he must be supplied with an abundance of pure air. At these mines the shafts and levels are of good size, which can work much cheaper than small shafts or levels. A good system of contract is also carried out here; as the waggons are loaded at the different points underground they are run on the cage at the shaft, and hoisted to the surface; the rocks are taken to the stone-breakers, of which there are two; after being broken, the ore, &c., passes on to a large revolving table, where it is selected by boys, and thence by rail to the dressing department; the other kind of ores and smalls are taken and calcined, and passed afterwards to the crushers, and so elevated to the classifying trommels. The dressing-house is seven English miles from the mines, and all ores are transported from the mines by a well-constructed railway, built by the company in a substantial manner, and using locomotives. The dressing-house is an elegant brick building, covered with zinc plate, and the building, as you may suppose, is very extensive, on account of the large quantity of ore which passes through the dressing machinery every month. All the dressing machinery is driven by water, as also the turning and fitting machinery. All the most improved dressing machinery can be seen here, which, by the way, Germans are famous for. I observed Brunton's, and an endless variety of percussion tables, but the preference was given to the end percussion table, as being best adapted for the class of ore they have to deal with; the latter, a great number of them, are well arranged, and hung by chains, from cast-iron pillars about 3 ft. high, at each corner, with screws for elevating or lowering the tables. This I consider a vast improvement on the old plan of wooden frames, which affords plenty of room for the persons in charge. In erecting percussion tables great attention should be paid in forming a good solid bed for the table, whether end or side percussion is adopted.

To enable the work to be continually carried on, a boiler is erected in the dressing department, and the house is warmed by steam-pipes fixed to the walls, and when lighted by gas is a grand sight. A small quantity of lead ore, rich in silver, is found to accompany the zinc-blende, which is very carefully dressed and shipped in barrels. In examining these mines and dressing department one cannot help admiring the system that is carried out in each section of the operation. The practical working of the mines are under the charge of the engineer and his assistants. At the dressing-house the manager, inside the house, is responsible for the proper dressing of the ores. The assayer has his own department, and takes samples of the ore from the different machines and tables; the waste also is carefully assayed. Your readers are no doubt aware that the Vieille Montagne Company is the first company in the world, and well earned the prize awarded them at the great Exhibition in Paris; as I presume that no other mining company pays such attention to the officers and labourers, socially and morally, as this company does. Children are provided with schools on the mines; hospitals for the sick, and a home for the aged is one of their institutions.

Anyone interested in mining, and wishing to see a Model Mine, would be well repaid by a visit to these mines, and no more pleasant trip could be selected in the summer than a visit to Sweden. The mines can easily be reached by water from Gothenburg through the canal and lakes, affording a splendid view of several falls, besides passing through the two largest lakes in Sweden. WM. HOSKIN.

Mining Office, Orebro, Sweden, Dec. 1871.

MINING ON THE RHINE—No. XIII.

SIR,—Truth and justice alike demand that "A Rhinelander," whose letter appeared in the Journal of the 30th ult., before publishing in your paper of world-wide circulation; statements calculated to mislead the public and to prejudice private property, should have made himself master of the facts, and stated only the truth. First, "A Rhinelander," in reference to St. Josephsberg Mine, says—"I learn by enquiry that the so-called by him (your correspondent) celebrated and rich St. Josephsberg Mines, instead of paying the enormous dividends promised are not returning mineral enough to pay half the working expenses." Had "A Rhinelander" wished to state the simple truth he would have said that the St. Josephsberg Mining Company, having before them the reports of Freiherr von Hüne, principal inspecting agent of, and toiler for the Prussian Government, and of Herr Dismann, another of the Crown agents, extending from February, 1866, to Feb. 20, 1867, on which last day a special report was made by Freiherr von Hüne, under the provisions of the General Mining Laws of Prussia, as well as the returns of ore, extracted from the books of the company, which showed that the mine had been immensely rich at and above the 85 lachter level, decided on erecting an engine of 60-in. cylinder, and sinking a shaft to the 120 lachter level, and then driving cross-cuts to and levels under the rich courses of ore left in the bottom of the 85 lachter level; that the St. Josephsberg Company are steadily carrying out their purpose; that they are doing no work beyond sinking a perpendicular main engine-shaft, which is now 80 lachters deep; that instead of not returning mineral enough to pay "half their working expenses," they are not attempting to raise one ounce of ore. This expression "not returning mineral enough to pay half their working expenses," proves either that the expression "but sad to say, I learn by enquiry," in as far as the "sad to say" is concerned, the sadness is sheer hypocrisy, and the second term in the sentence, "I learn by enquiry," incorrect; whilst the "not returning mineral enough to pay half their working expenses" is an attempt to injure the property by an insinuation that ore has been sought for and not found, the truth being, as before stated, that the only work in progress is sinking of the engine-shaft.

This mine has been regularly reported on from February, 1866, to February 20, 1867, by Freiherr von Hüne, the report at the last date being special to his Government; over the same period by Obersteiger Mühlenbein, his reports being to his then employers; by Herr Dismann, for his Government; by Captains Stephens, Glanville, and Richards; and I ask "A Rhinelander," are not the official reports of the Government agents, the resident captain of the mine, entered in the cost-book, and the reports of the three last-named Cornish mining agents as much to be relied on as those of the gentlemen intended to be advertised by his letter of the 22d, and by that published a few months since in the Journal? "A Rhinelander" is regardless of the accuracy of his statements since he proceeds to write, "and as to the celebrated and rich Phœnix lead and silver mines, the last account I heard is that the bailiffs are in possession, and that Capt. Richards, the manager, who had promised the company such handsome profits, had not been seen in the neighbourhood for some weeks." Now, the fact is that the bailiffs are not in possession. That Capt. Richards, instead of not having been seen in the neighbourhood for "some weeks," has ceased to be manager for about a year; that Captain Andrews was appointed in his place, since which Herr Klöver has been manager, and for the last six months the mine has been managed by Herr Jäger, under the direction of the Herren Meurer. Before this property was purchased it was inspected by Capt. Thomas Rickard, the mineral inspecting agent of Messrs. John Taylor and Sons; by Capt. Thomas Trevillian, of Herodsfoot Mine; and by Capt. S. Richards, the late manager. The inadequate capital, and the delays and expenses by the late war, and not the poverty of the mine, were the causes of its suspension, as is evident from the following extract from the report of Herr Mülenbein:—

"From the 41 lachter level about 43 lachters have been driven north-east to cut, the lode on the eastern side of the eastern cross-course. When I was last on the mine it was my opinion that by a moderate expenditure a fine lode would be discovered. The work recommended by me has been done, and a splendid lode cut fully 15 ft. wide, carrying 18 in. of blende, and 9 in. of clean lead."

Herr Höller, the Government markscheider, or mineral surveyor, on Sept. 8 last reported on this mine:—

"As directed, I have surveyad the mine and completed the plans of the underground works, and enclose tracing of the 41 lachter level, driven north, by means of which the lode has been discovered east of the cross course, which at once constituted your lead mine one of the most valuable mineral properties in Germany."

He then proceeds—

"The 41 lachter level must be extended east on the course of the new discovery, where the lode is fully 15 ft. wide, and carries a leader of blende 18 in. wide, and 9 inches wide of clean lead ore. As the lode has been cut at two points to the east, the more distant of which is at least 700 lachters to the east of the new discovery, carrying lead up to the surface at two places, the value of this piece of lead ground can scarcely be over estimated."

Both of these agents speak in equally strong terms of the lode between the cross-course, the Onyx lode, and the Lux and Ajax lodes. The Menzenberg Mine, also referred to, needs only to be seen to prove its value. Were I in the position of the two gentlemen of Cologne referred by "A Rhinelander," my exclamation would be, "Preserve me from my friend." OUR CORRESPONDENT.

MINING IN CALIFORNIA—THE GENERAL LEE, &c.

SIR,—As large amounts of money have been recently invested by English mining capitalists in this portion of the State of Nevada, a brief sketch of their last purchase may contain some information of interest to these gentlemen in particular, and possibly to a large majority of your readers.

The English public is already tolerably well acquainted, through the medium of the *Mining Journal*, with the mines at Mineral Hill, White Pine, and also some claims in this district, the Richmond Mine to wit. Their last purchase, and in my opinion their best, is that of the General Lee Consolidated Mines. After a careful examination, I am now prepared to furnish the following facts regarding this fine property.

The General Lee Mine was discovered in October, 1869, and a claim of 1600 ft. taken up. The Wide West, about the same time, claiming 800 ft.; the Stonewall, 1000 ft.; Consort, 1600 ft.; and Webfoot, 600 ft., making in all 5600 ft. of what is now well-developed mining ground. The hill in which these mines are situated consists chiefly of a peculiar kind of dolomite, or limestone, and is identical in formation with the enclosing rock of the Richmond and Eureka Consolidated Mines, and also with that of the famous argentiferous deposits of Zacatecas and Batopilas in Mexico, and with several of the most productive silver mines in Chili.

The General Lee claim, upon which the largest amount of money has been expended in the way of developments, was first explored by a tunnel which was started on the slope of a ravine near the southern boundary of their ground, and at a point where the outcrop of the vein was most prominent. This tunnel, which has followed the lead for a distance of 200 ft., has exposed along its entire length a true fissure vein of an average width of 4½ ft., with smooth and well-defined hanging and foot walls, and carrying the clay-streak or flookan, always considered by miners as a never-failing indication of a permanent lode. As the outcrop of the vein was very distinct along the surface of the ground, not the slightest difficulty was experienced as to the points at which shafts should be commenced for the purpose of developing the northern portion of the claim. Consequently three shafts were started almost simultaneously, and at such distances as would fully prove the continuity of the vein followed in the tunnel for a distance of about 1100 ft. All of these shafts have been sunk on the lode itself, which is almost perpendicular, its dip to the south-west being scarcely perceptible. The regularity of the vein, as regards width, dip, and value per ton of ore in the precious metals, is very remarkable. The discoverers, in order to fully test the actual value of their property, as well as to supply the funds necessary to defray the great expenses of the works they were carrying on, shipped to various reduction works at an enormous expense 250 tons of ore, taken without selection from the tunnel and the various shafts referred to. This parcel of ore was sampled into two lots, comprising 100 tons of first class and 150 tons of second class ore. The former gave the extraordinary average of $280 per ton in silver, and $10 per ton of 2000 lbs. in gold, by ordinary mill process. The second-class rock varied from $89 to $125 per ton, and contained about 1½ per cent. of lead. Fully satisfied with the extent and richness of their northern mines, attention was now turned to those south of the ravine formerly alluded to, and across which the lode was traced by means of a number of open cuts and other surface workings, until a bold outcrop was reached about 600 ft. south of the Lee tunnel, and here, on the Wide West claim, work was vigorously prosecuted at several different points similar to that done on the General Lee. The owners were richly rewarded for their outlay—the vein developed in the Wide West claim being fully equal in every respect to that of the Lee. But 147 tons of ore from this mine were shipped for reduction, and the handsome average was given of $95 per ton in silver, and $60 per ton in gold, making a total of $155 per ton, with 6 per cent of lead.

Such extraordinary yields as the above, from 397 tons of unassorted rock, could not fail to attract the attention of mining capitalists in San Francisco to the property, and an English gentleman, Mr. Robt. Barton, one of our most distinguished mining engineers, visited the district, and carefully examined the property almost daily during the three months he spent among us. Mr. Barton, whose long experience in Mexico and on this coast was of especial value to him in this limestone region, having fully satisfied himself as to the value and permanency of the mines, immediately concluded the negotiations he had opened with the owners of the property for its purchase. I have been unable to learn the exact figures at which the sale was made, but understand they were far below the actual value of the ground. It is the intention of Mr. Barton and his associates to erect reduction works early next spring, and work together as a private company. It is not their intention to incorporate, or to subject their property to the fluctuations of the stock market. Under the new owners, a large force of men has been employed, and the developments made on the General Lee, up to their extreme northern limit, and to a point about 1500 ft. distant from the mouth of the tunnel, have been such as to astonish the old miners of this State, accustomed though they be to see very rich silver ore.

The location of the district, its distance from the Pacific Railroad, the cost of transportation of mining machinery, rates of miners' wages, value of fuel and supply of water are all important points, and can be briefly summed up:—miners receive $4 per day; freight from the railroad (about 80 miles) is at present $20 per ton; but this item will be reduced one-half when the narrow-gauge railroad is completed next year, and by which means the district will be brought into direct communication by rail with San Francisco and New York. The supply of wood and water is abundant; the former worth $6 per cord of 128 cubic feet. The total cost of extracting and transparting the ore to the point selected for the location of the mill will not exceed $4 per ton; cost of reducing and extracting the precious metals will not exceed $17 per ton; and by mill process ore is now worked up to within 8 per cent. of the assay value. These figures, which are strictly correct, will leave a splendid profit to the fortunate owners, and doubtless, under the able management of Mr. Barton, the General Lee Consolidated will prove one of the most valuable pieces of mining property on the Pacific Coast.

Eureka City, Nevada, Dec. 12. W. G. KELLY, M.E.

THE SWEETWATER MINES, WYOMING.

MINERS' DELIGHT EAST.

SIR,—The original location of the Miners' Delight Mine was made by a number of prospectors in 1867, and consisted of 1600 ft. After a time it was found desirable to diminish both the number of feet and the number of partners. A division was, therefore, decided upon, a number taking 800 ft. west of an established line of division, and the others taking 800 ft. east. A former letter has treated of the west end of this mine, and it is my purpose to make the east end the subject of this sketch.

Of the situation of the mine it is unnecessary to speak, as it would be simply a repetition of a portion of the west end description; it may, however, be advisable to state that it is in close proximity to Hamilton City, the military post of Camp Stambough, and the other mining towns of this section. The vein proper is situated in the granite and slate formation, and has shown itself to be a true fissure vein.

The developments upon this end of the mine are as follows:—The main shaft is sunk to a depth of 60 ft., and an air and escape shaft is of the same depth. From the main shaft the upper level, running east, is 72 ft. in length, and at the bottom a similar level east 80 ft. in length; also, one level running from the bottom of the main shaft, 50 ft. west. This level connects the main and air shafts. The main shaft is 9 ft. by 4½ ft. in the clear, and is heavily and permanently timbered, with complete slide and ladder-way. The air-shaft is also well timbered, and contains a ladder for use as an escape.

The expense heretofore experienced in procuring the timber and lumber necessary for the protection of the mine is now obviated, as the slate walls have assumed so firm a consistency that heavy timbers are no longer necessary for its support. The levels are 6 ft. by 4 ft., and are protected, where the ore has been stoped out, by heavy stalling and lagging. Altogether, the mine is in better shape than any in this section of country, not only so far as looks are concerned, but for permanent work. The vein exposed by the shaft, which follows the vein at an incline of about 75° south, and as also exposed by the levels both east and west, will average 4 ft. in width. The ore is fine grey quartz, containing free gold, which can be seen in the ore even before it has been mined. Specimens of free gold quartz abound in the greatest profusion, and the mine is noted as having supplied more cabinets of mining, both at home and abroad, than any mine in the country. The average yield of the rock from the surface to the present depth has been about $20, but the vein exposed by the lower level contains ore which will average $50 per ton: 800 tons of the rock have been crushed from this mine, which yielded an average of $20, or thereabout. There is now in sight, disclosed by the different levels, about 1000 tons of quartz, of the same character as that crushed. The cost of mining 1 ton of this ore is $1, and $3 more for reducing, making the entire cost $4 per ton. A 20-stamp mill will reduce 30 tons per day. Allowing the ore to yield $20 per ton, and cost $5, all told, for mining and reducing, gives a net profit of $15 per ton, or $450 per day. The ore is a loose, shelly quartz, easily mined, and I am informed by the manager that in mining the levels but one blast of powder was used. No powder is used whatever in stoping the ore.

In close proximity to the mine is an immense quantity of suitable timber, both for fuel and buildings; also, there is plenty of water for mining and milling purposes; in fact, were the shaft sunk to a depth of 150 ft. it would supply sufficient water for all purposes.

The west end of this property is now in full operation, with the ore at a depth of 140 ft. yielding from $30 to $80 per ton. All that is required to make this east end of the Miners' Delight one of the best paying mines in the United States is sufficient capital to erect the necessary hoisting and reducing works, and from the day the mill would commence operations the foundation would be laid of a record which when completed would be unsurpassed by any mine in America.

South Pass City, Wyoming, Dec. 18. M.

"THE SCIENCE OF INVESTMENT."

SIR,—There unhappily exists no records of the capital embarked in mining enterprises, nor can we arrive at even an approximate estimate of the money involved. To compare mines with railways is absurd, yet I may fairly state that the former absorb scarcely 25 per cent. of actual expenditure on the workings that our railways have cost us—530,000,000*l.*; still, we are enabled to refer with some degree of accuracy to the revenues of our mines, and contrast them with our railways. Our mines yield us over 40,000,000*l.* annually, against 47,500,000*l.*, the total receipts of our railways for the year just ended—a sum equal to 9 per cent. on the 530,000,000*l.* expended As regards railways, whether free trade was or was not the best principle to be adopted in 1845 need scarcely, at the present time, to be debated; the more pertinent enquiry concerns the expediency of the opposite course—amalgamation or protective, instead of competative, conduct on the part of "boards" of rival companies. The receipts of last year year were fully 3,000,000*l.* in excess of those for 1870, which had already exceeded by 2,000,000*l.* those of 1867. There is some increase of expenditure on the other side, but the proportions appear to be all in favour of the railways. The average cost of working two years ago was 49 per cent., and last year it was reduced slightly under 48 per cent., so that the gross gains of our united railway investments exceed 4½ per cent., or (say) 24,700,000*l.* annually. The quotations in the share lists clearly show the growing and favourable estimation in which railway property is held. Trunk lines are all but completed, and the theory of branches is pretty well understood. Improvements are to be looked for in traffic, revision fo existing working arrangement, and in the application of receipts there is any amount of advantages to be gained; so that the future is fraught with every prospect of increased dividends. All feel that with ordinary prudence, absence of unnecessary competition, with friendly exchange of mutual accommodation, and in the absence of monopolies, the public interests can be consulted, and the gains become enormous on our 530,000,000*l.* invested in home railways.

It is not so easy to discern the gains of our mining pursuits as it is to discover the present position and the future of our railways, Consols and the Funds stand first in our investments, railways next, and unquestionably mining third, for it is monstrous to regard joint-stock banks and finance companies in this go-a-head country otherwise than as speculative concerns and adventures. We are, and shall for the future, be subject to periodical and unexpected panics and monetary disarrangements. These have and ever will affect this character of property; hence mining, which in no respect is more hazardous, is most worthy the attention of the investing public. Wherein in joint-stock banks can such instances of substantial and rapid gains be shown as in Tincroft, Carn Brea, Dolcoath, Cook's Kitchen, Botallack, South Caradon, or Par Consols? These mines were at work and prosperous before the London and Westminster or Joint-Stock Banks were even in embryo, and will continue in existence when half of those created within the last ten or twelve years are wound-up in the Court of Chancery. The leading banks, however, will give good dividends during the current month for the past half-year.

To make mining pay earnest application and investigation is required, as is the case in every other branch of industry: the student of the science of investments should study his subject—intelligence, nerve, and money are alone required to make mining pay. Market dealings and popular companies do not necessarily imply good and profitable mines. Capitalists in Cornwall availed themselves of the long-existing pressure on speculative enterprise, and secured the valuable shares, at ridiculously low prices, which the public held in

which he fabricated. It is more than probable that this highly gifted individual was himself impersonified by Vulcan, of heathen mythology. His memory must have lived and been held in the deepest veneration by many successive ages, and would doubtless have given rise to his deification and the consecration of those temples and other stupendous monuments to his honour which, erected in the Cyclopman era, now, as vast mementos of early civilisation, by their ruins excite the astonishment and stimulate the curiosity of the modern traveller. Further references occur in Scripture to iron. In fact, they are too numerous to quote. I shall confine myself to a few of the most striking. Moses, learned in all the wisdom of the Egyptians, held out as an inducement to the Israelites to persevere in their toilsome journeyings to the promised land that it was one "whose stone are iron, and out of whose hills thou mayest dig brass"—(copper). Iron in its pure state being much too soft to be applied to the various purposes of agriculture, domestic economy, and warfare, it must have undergone certain processes to render it suitable. Again, native iron being found in exceedingly rare instances, being almost universally associated with oxygen, sulphur, and other foreign matters, it demands the exercise of the utmost ingenuity to separate the metal from its ore, an ingenuity, in fact, which far exceeds that of the separation of gold, silver, tin, or copper from their impurities. This object being effected exhibits the wonderful state to which the chemistry of metals, or otherwise metallurgy, had advanced in the very earliest state of the world's history, and collaterally with other evidences of the skill displayed at this period tends to confirm the words of Soloman "there is nothing new under the sun." *Au revoir.*

Laboratory and Assay Office, W. WHITE.
25, *Finsbury-place, E.C.*

WITH WHAT ARE THE STRATA ABOUT PRODUCTIVE COPPER LODES MINERALISED?

SIR,—The question heading this paper seems to have attracted considerable attention, but hitherto without any apparent beneficial results. This may have been from the vague and indefinite nature of the question itself. The term "mineralised" is a somewhat comprehensive one, and embraces a variety of things, and the sense intended by its use in connection with strata in subserviance of metalliferous deposits ought to be clearly defined previous to the discussion of any question relating thereto.

The meaning of the term "mineralised strata" I conceived to be very different from that intended to be conveyed when applied to other mineralised substances—the metals themselves, for instance, which are mineralised in the one form in which we find them. This is said to be produced by chemical association with other bodies. Petrifactions also are mineralised substances; the tissues of animal and vegetable matter are either destroyed or converted into minerals by being impregnated with mineralising substances. Waters are also said to be mineralised when they contain mineral ingredients in a solvent condition. But the sense in which I apprehend the strata to be mineralised is altogether different from the above, and, indeed, from the sense and significance usually ascribed to the term.

Mineralisation of strata must mean, and can only mean, its impregnation by metallic particles in one form or another, mechanically and not chemically combined, and, therefore, may be extracted therefrom without the rocks undergoing dissolution. It is a remarkable fact that whilst the several earths which enter into the composition of all rocks are themselves the oxides of metals, they should be at the same time the prolific source of all the other metals, which are in no way essential to their own identity and being.

I do not see what necessity there is that the practical mining engineer should be an accomplished analytical chemist, as he must of necessity be to make correct quantitative analyses of all the rocks comprising the metalliferous belts, as some of your correspondents seem to think from the way they express themselves on the subject. And if it were ever so desirable, or even necessary, there is no probability of its ever being realised, since the time necessary to qualify a person as an accomplished analytical chemist would leave him but very little time to qualify for the equally arduous duties of mining. Further, one would be almost led to conclude that it was believed by many that an analytical examination of the strata would, of itself, be sufficient to determine the value of the lodes contained therein, independently of any examination of the composition and general properties of the lodes themselves. If such be the case, a grosser error can scarcely be entertained. There is no single condition that I am aware of sufficient to justify such a conclusion, short of the actually ascertained value of the lodes themselves, and that can only be arrived at by their development. In the ordinary way of estimating the value of lodes prospectively a number of conditions are regarded, familiarly known to most experienced mining engineers, and, therefore, I need not now stay to enumerate them, but will simply say that, prominent amongst others, the character of the country rocks hold a conspicuous place. And why, it may be asked, is this the case if the convictions of those engaged in mining were not that the character and value of the lodes were determined by the nature and composition of the rocks in which they are found? This, it must be admitted, is a very strong proposition, and one the truth of which, within certain limitations, is incontrovertible. But it has its limitations, and beyond that is vulnerable on all sides. In taking our stand on the truths contained in this proposition as a pedestal, nothing is more natural than the desire to ascertain of what ingredients the country rocks are composed, as a "basic" fact upon which to theorise or reason respecting the probable value of lodes contained therein, and which are as yet undeveloped. But this, I fear, is one of the plausibilities doomed to give place, beyond certain very qualified limitations, to facts which will admit of no compromise. I have stated in a former communication to the *Mining Journal* on this subject that the strata and also the water of some poor mines contain a greater percentage of copper than those of many rich mines, and these are facts which have a very appreciable bearing and influence on the question we are considering. In investigating subjects like this, it appears to me best to do so with reference to its practical issue, and, in consonance with this view, it may be proper to ask is it necessary to a due appreciation of the quality of any stratum for the productiveness of lodes contained therein to be informed of the several ingredients, and of what quantity of each, it was composed? I submit, with all deference to the judgment and experience of others, that it is not. To illustrate what I mean, it may be necessary to add—If search were being prosecuted for copper, and the evidences of its presence in the lode itself were not very impressive, yet at the same time it was found by analysis that the surrounding rocks contained the several ingredients in due proportion known to constitute those of the richest mines, with but the single exception of copper itself, no trace of which could be found, would the approved uniformity of the composite character of the rocks in all other respects compensate for this single deficiency—the absence of copper—and operate to stimulate and sustain confidence in the ultimate success of the enterprise notwithstanding? I am decided in my own opinion that it would not, but that every presumption founded on such a basis would be considered untenable. Of course, it is to be clearly understood that these remarks are intended to apply to stratified rocks only, and those in which the known favourable auxiliaries to the deposition of metalliferous deposits do not exist, such as cross-courses, slides, faults, elvans, &c. On the other hand, would the presence of copper in unusually large quantities in the strata have the effect of establishing one's confidence in the success of an enterprise if there were a remarkable absence of that desirable commodity in the lode itself? I am aware that this is a very delicate, yet at the same time equally strong, way of propounding a highly important question, one which will admit of no other than a qualified answer; yet it is pertinent to the issue, because such a condition of things exits, and mining enterprises are largely affected thereby.

We are well aware, all other things being equal, that a better ground of hope exists under these circumstances than if there were an entire absence of metal from the strata as well as from the lode, yet cannot refrain from saying it might eventually be found of that class which maketh the heart sick. I have not the least doubt but that there is a stage in the progress of the metals when they are widely diffused, and another stage in which the schme of their concentration and development is realised, and that between these two extremities a regular gradation from the lowest to the highest extends, and *vice versa*, from the pinnacle of the perfection of their nature downwards again to dissolution. There is no halting in nature—no suspense, every achievement denotes a change, which in its turn becomes a part and the necessary precursor of other changes destined to succeed and proceed from one to the other, *ad infinitum*. It is quite possible from this view that many lodes may be attacked by the miner long before their growth and mature development are complete, in which case the metals can only be supposed to be, to a very important extent, diffused through the country rocks, both contiguous and remote, and in such condition and at such stages can scarcely be supposed to be mineralised, as that would imply chemical association with other bodies, of which no trace of evidence, so far as I have ever seen or heard of, exists. But there are evidences of the existence of the metals in the most simple condition of their nature mechanically combined with the rocks; and as their existence in any form implies design, and a purpose in connection with mankind, and as no useful purpose can ever be subserved by them in their present condition, it is to be presumed, if more direct evidence were wanting, that the metallic particles, so sparingly diffused through the rocks, are destined eventually to congregate and consolidate in fissure veins and other kinds of deposits.

I have already exceeded the limits of an ordinary letter, and that prescribed to myself at the commencement of this, still my argument is incomplete, and many thoughts suggest themselves to my mind; I have, therefore, to beg the favour of being allowed to continue my remarks in another communication. ROBERT KNAPP.

Ellsworth, Nye county, Nevada, Dec. 13.

THE "UNIT" OF COPPER ORE.

SIR,—I shall be obliged if one of your correspondents will kindly inform me what is meant by the "unit" of copper ore; how it is arrived at; and how the "unit" affects the prices or values of copper "ore" and "fine" copper per ton—in other words, what is meant by "17*s.* 6½*d.* per unit?" I should also be much obliged if someone would inform me what the "standards" for tin ores are. I know that the smelters fix them periodically, but I want to know upon what the calculations are based, as it appears to me the "standards" are variable bases of calculation, formed upon no other theory than the whim and fancy of the combined smelting-houses. J. T.

Wiltshire-road, Brixton, Jan. 10.

THE PRICE OF COPPER.

SIR,—Seeing the difference of opinion respecting the probable course of copper, I am induced to ask you to insert the following remarks in next week's Journal.

Copper, like everything else, must be subject to the all-powerful rule of supply and demand, and it is well known to all who have had to do with the article that its price ruled during the lifetime of anyone who has had transactions in it (until within the last four or five years) at considerably over 100*l.* per ton, and then it had to give way to the greatly increased production from rich mines in Chili, far exceeding the consumption—to such an extent that enormous accumulations of stock, both here and in Chili, drove down the price to a rate hitherto unheard of. The consequence of this was that the miners, all the world over, "picked out the eyes" of their mines, and the reaction from this state of things is now being felt in a greatly reduced production, both in Chili and Cornwall, with, at the same time, the heavy stock which has so long weighed down the market, less than one-half of what it was a year since.

What, then, is the present position of the article? A consumption which has reduced the stock 10,000 tons in the year 1871, with the probability of its continuing at this rate for some time. The present stock almost entirely in the shape of foreign copper, the quantity of ore and regulus being, from what I gather from brokers' circulars, under 2000 tons, and the certainty that the English smelters must purchase largely Chili bars and other foreign copper to enable them to carry on their business. With these facts before us, can it any longer be a matter of surprise that the price has advanced 25*l.* per ton from the lowest point; and seeing it is now much below the average of years when supply and demand ran "neck and neck," may it not reasonably be expected that a further advance will take place? I gather also from the circulars that the Indian demand for some time past has been very small, and the French much below its usual quantity. If, then, these two important markets should require a supply during the current year, is it not probable that we may see the price advance to its old point of 120*l.*? Being interested in tin as well as copper, I well remember a smelter, with a knowing nod of the head, saying the price of 75*l.* for tin was with difficulty maintained, and shortly after an advance began, and went on till the 75*l.* became 150*l.* And why not, I ask, the same thing in copper, since the same rate of supply and demand governs it?

I am aware it is said the smelters did not not foresee the advance; and so keep up their stocks, and, therefore, will try to keep down the price, but could the tin smelter keep down the price? No; for they, too, must bow their heads to the little rule of supply and demand. There are many things beyond the control of them, and many men have yet to learn this.—*Jan.* 10. A MINER.

THE COPPER TRADE—THE LORDS.

SIR,—My prediction repecting the price of copper during the last two or three years has been fulfilled during the past month or six weeks; and I believe that copper must go very much higher in price, from the circumstance that two-thirds of all the copper mines in the world have ceased to exist, owing in a great measure to the depression in the price of the article. Many of the most celebrated copper mines were compelled to produce all the ore it was possible to raise to keep the mines afloat as long as they could, but the long-continued depression in the price of the article caused the greatest mines to give way at last. To open up old and deep mines is a time of years, and in most cases requires a very large amount of capital. The stocks of copper are considerably reduced, we are informed by statistics in the various publications, and the demand increasing. As a general rule, when prices are very low consumers invariably run their stocks very low also. Mines in Chili, as well as in other countries, have become exhausted, and new mines must be found, and when discovered roads or canals have to be made to take the ores to market; this is a work of years in most instances—one extreme invariably produces another

Now is the time for the landowners to act a little more liberal, and encourage capitalists to invest a portion of their capital in British mines, which, on the whole, pay best in the end, and not attended with half the risk; but reckless concoctors of public companies prefer bringing out something foreign, on account of being able to charge 20 times the premium for the property they introduce, and the investors have no means of judging as to the value of the property offered them but by reports. Gentlemen are sent out to inspect and report on properties they are totally unacquainted with, and the public are invariably misled. Because it is a foreign affair it must be good, but the last 10 years a different tale could unfold.

Jan. 9. A. BENNETT.

THE MINERS' WAGES MOVEMENT.

SIR,—The present agitation in Cornwall for the disarrangement, if not the upsetting, of the recognised and established rules by which the general affairs of mining are conducted, simply because the miner wants a few shillings per month extra wages, appears to all who are really interested in this branch of national industry as something really preposterous. Led away by the wild, unfortunate notion of a few idlers, and aided by a well-known class of tradespeople, whose dealings under the late bankruptcy laws were of a somewhat dubious character, the miner some few years ago was tempted to strike in the eastern part of the county, but finding that mining, unlike any other enterprise, admitted of an agreement between the different proprietors, and that the stopping of mines, nine out of every ten of which were not paying cost, was rather a gain to the proprietary than otherwise, the attempt failed, and work was in only a few days gladly resumed.

Remembering these facts, I would now caution the steady, industrious miner against being again deceived, and I would, at the same time, lead him to believe that those who, by the expenditure of their capital, were the means of giving employment throughout the county, have, after all, some little interest in his well-doing, and are, perhaps, just as likely in the long run to prove his real friend as any of those correspondents who in the local press have of late been moving so much to the contrary, exhibiting, at the same time, such want of knowledge of the practical details of the subject on which they have been writing as has seldom been equalled in any public controversy.—*Jan.* 10. VIATOR.

FIVE-WEEKS MONTHS.

SIR,—I have read numerous letters on the subject of five-week months, its abolishment in Tincroft and Carn Brea Mines by Capt. Teague, and the great benefit said to be conferred thereby on the miners. I am at a loss, however, to discover in what way the payment of miners 13 times in the year instead of 12 will benefit them. The change in the system will give every man engaged at a fixed monthly salary an extra months pay in the year, and that is the extent of the benefit. But to the tributer or tutwork man I contend it makes no difference, as to the amount of their earnings, whether they are paid 12 times or 20 times during the year. Give men always a fair price in sight for their work, without reference to the preceding month, and then if they work five weeks they will earn one-fifth more than in four weeks. Where, then, is the hardship of a five-weeks month? I have for over 30 years made it a rule to give men a fair price in sight and extent, always for the month. I have often set 10 fms. in a shaft in one bargain, and with fair-play to employer and workmen five weeks or four weeks is quite immaterial. Again, if surface people work four weeks I pay them for 24 days, and if they work five weeks I pay them for 30 days. So where is the pretended benefit to the people in paying them 13 times instead of 12 in the year?—*County Cork, Jan.* 8. A MANAGER OF MINES.

ON NEW JOINT-STOCK MINING COMPANIES.

SIR,—In the midst of the excitement at present attending the constant discovery of fresh deposits of the precious metals in Western America, it may not be unprofitable to recall what took place under similar circumstances upon the discovery of gold in Australia. Then, as now, mining companies were formed in this country with capitals which then appeared enormous. Although small compared with the present scale, and dividends of almost fabulous amounts were promised to those who would take shares, I need not say that these promises proved delusive. Among the promoters and managers of companies some were, no doubt, honest and over sanguine; others self-seeking, most incompetent, and the money so eagerly supplied by confiding shareholders brought no return. Yet the Australian fields were no less richly charged with their precious freight than are these new regions in the Far West. Have we, then, in these new undertakings special grounds for believing in a more successful result? A superficial view of the constitution of the companies would scarcely warrant such a conclusion. We see the purchase-money put at an amount which seems very great when we consider the uncertainty to which all mining operations are subject, and when we further consider how little developed, comparatively, the properties were when handed over. Then, the available remaining capital seems too small for such large concerns.

Can we gain more satisfactory data from the reports of the mine managers and experts? I at least am unable to do so. There may be first-rate managers at the mines, but from the reports I have read I should conclude their number to be small. Now, to show the value of a really efficient manager, I will relate what happened in the case of one of the Australian mines above alluded to. As in so many similar instances, a capital of some 100,000*l.* had been spent, and there was so little to show for this outlay that a share on which 11*l.* had been paid was to be got for 2*s.* 6*d.* At this time a new manager was appointed, whose first report I accidentally read, and to my surprise I found it in every respect a masterly production. Every detail of the concern was given in proper order, and every circumstance considered which was likely to affect it. Although this report dashed to the ground the delusive prospects held out by the original promoters of the undertaking, it showed by reasonable inference from definite data that a fair return might still be hoped for on the outlay. I at once bought shares in the Port Phillip Company, and I need not say that I have never repented of my bargains, Mr. Bland's able management having more than realised the results his first report lead us to expect. When I can see a report from a manager in these new undertakings upon the model of Mr. Bland's reports on the working of the Port Phillip Company, I shall give it mature consideration, and shall, perhaps, become in a second instance what I can for once describe myself,

A SATISFIED SHAREHOLDER IN A MINING ENTERPRISE IN FOREIGN LANDS.

"WHAT TO SELECT—WHAT TO AVOID"—No. VII.

SIR,—It is no less instructive than satisfactory to find that, with the gradually improving condition of the metal market, a uniformity of opinion prevails that in importance and extent home mining is gaining a position far beyond anything it has hitherto attained. This is the more gratifying because the time has not long gone by since we were told that Cornwall as a mining centre could only be recognised as a "fact of the past," that its mineral produce could never again command a remunerative value; that foreign mines were able profitably to supply every market, and meet every demand at such prices as to render Cornish tin mines utterly profitless; and as to copper, the illimitable discoveries in different parts of the world left no gleam of hope for Cornwall's copper mines.

Only two short years have elapsed since such forebodings as these were ever being obtruded before the investing public. True, for a time Cornwall's mines passed through a very severe ordeal, during which many succumbed, the remaining few trembling in the balance; but what a total change has ensued, how different every prospect—the produce of our home mines is realising increasing value, copper is steadily and substantially advancing in price, and in face of a considerable diminution in the shipments, and an enlarging consumption, a much higher quotation is all but certain. Tin, too, has attained an unprecedented value, notwithstanding the recent slight reaction, while the market for lead warrants the expectation that still higher prices will rule.

Stubborn, irrefragible facts like these, illustrative of the expanding vitality of mining, should never be forgotten during periods of temporary depression. Mining possesses a vitality inseparable from the material industries and commerce of the world; the additional purposes to which metals are being almost daily applied naturally create a constantly increasing consumption, which must augment proportionately with the development of trade and progress of civilisation.

PACIFIC.—This company was originally formed for the purchase of three mines in California and Nevada. The Union Hill Quartz Mine was subsequently abandoned, and the Buckeye Hill Mine was disposed of to the Sweetland Creek Company, leaving the Lander Hill Silver Mine, which is now being successfully worked by the Pacific Company. It is situated near Austin, Nevada, and comprises a lateral extent of 2500 ft. There are two shafts, one perpendicular, and the other on the course of the lode. Within a reasonable depth it is calculated that other productive lodes will be intersected in addition to those at present being developed. The mine is amply provided with machinery, there being a pumping-engine, drawing-engine, two reduction works, steam-stamps, amalgamating-barrels, calcining-furnaces, &c. There can be no disguising the fact that in the interim between the purchase and the taking possession by the company the mine was most unfairly treated, the whole of the available ore having been removed. It has, therefore, taken a long time and considerable expenditure to place the mine in a productive condition. One of its leading favourable features is the exceptional richness of its ores, as may be judged by the fact that when the mine was being actively wrought—which has not been the case since 1869—1030 tons of ore yielded $224,050 (equal to an average of $217, or 43*l.* 8*s.*) per ton.

The present management commenced operations in April, 1871, and the mine may now be said to be in a thoroughly effective working condition. Four new lodes have been discovered. The Metticom Mill has been put into working order, and a new amalgamating process established. The mill commenced working about the last week in November, and during December the mine delivered to the mill ore to the value of 3400*l.* The mill at present is only working

half time, owing to an inadequate supply of wood; but when this has been remedied (which no doubt is the case by this time) increasing profits may be expected. The shares are fully paid (7*l.*), and are at present selling at about 50 per cent. discount.

GREAT WHEAL VOR.—It is satisfactory to find that my anticipations as to the improving character of this once richest tin mine in Cornwall are being fully realised. Every point of operation maintains its value, and as the ground westward is being developed stronger indications are presented of its opening out a mine of great value. I may incidentally remark that I have just received information to the effect that the slight reaction in the price of tin referred to above is of a temporary character, and that a rebound must quickly ensue.

RICHMOND CONSOLIDATED.—By unfounded rumours these shares have been forced down in market value. Every information from the mine is of the most encouraging character. Its resources are being daily extended, and its reserves increased.

Pinner's-court, Old Broad-street. FRED. WM. MANSELL.

MINING IN SWEDEN—THE VIEILLE MONTAGNE COMPANY.

SIR,—The zinc and cobalt mines owned by the Vieille Montagne Company are the most extensive mines in Sweden; the Atvidaberg copper mines are also worked on a large scale, employing in the mines and smelting works 2000 persons.

As I stated in my last letter that the former owner of the mines and estates, now in the hands of the above-named company, worked the mines in a small way, and exposed the vast deposits of zinc-blende, since opened so extensively by the present company. For the mines and land I understand the company paid about 150,000*l.*; I may say that they were compelled to buy a greater quantity of land than was required for working the mines, as the dressing machinery is driven by water-power, and to obtain the right of damming up the stream from the lake near the mines, hence the reason of purchasing the land. The mines are situated in a wild and rugged hill overlooking a part or an arm of the beautiful lake Wettern. On a fine day the view is most delightful.

The lodes can be traced over a considerable extent of country; and a peculiar feature in this country is that the ore is generally found, as the expression goes, to make up to the surface, and appears to hold also in depth, as the Old Falu copper mines are 200 fathoms below the surface.

The zinc mines are nearly 100 fathoms below the surface, and immense deposits of rich zinc-blende are found as the lodes are opened in depth. The mines are opened in a practical manner, and well ventilated by fans when necessary, a matter very much neglected in many mines. To enable a miner to do a good day's work he must be supplied with an abundance of pure air. At these mines the shafts and levels are of good size, which can work much cheaper than small shafts or levels. A good system of contract is also carried out here: as the waggons are loaded at the different points underground they are run on the cage at the shaft, and hoisted to the surface; the rocks are taken to the stone-breakers, of which there are two; after being broken, the ore, &c., passes on to a large revolving table, where it is selected by boys, and thence by rail to the dressing department; the other kind of ores and smalls are taken and calcined, and passed afterwards to the crushers, and so elevated to the classifying trommels. The dressing-house is seven English miles from the mines, and all ores are transported from the mines by a well-constructed railway, built by the company in a substantial manner, and using locomotives. The dressing-house is an elegant brick building, covered with zinc plate, and the building, as you may suppose, is very extensive, on account of the large quantity of ore which passes through the dressing machinery every month. All the dressing machinery is driven by water, as also the turning and fitting machinery. All the most improved dressing machinery can be seen here, which, by the way, Germans are famous for. I observed Brunton's, and an endless variety of percussion tables, but the preference was given to the end percussion table, as being best adapted for the class of ore they have to deal with; the latter, a great number of them, are well arranged, and hung by chains, from cast-iron pillars about 3 ft. high, at each corner, with screws for elevating or lowering the tables. This I consider a vast improvement on the old plan of wooden frames, which affords plenty of room for the persons in charge. In erecting percussion tables great attention should be paid in forming a good solid bed for the table, whether end or side percussion is adopted.

To enable the work to be continually carried on, a boiler is erected in the dressing department, and the house is warmed by steam-pipes fixed to the walls, and when lighted by gas is a grand sight. A small quantity of lead ore, rich in silver, is found to accompany the zinc-blende, which is very carefully dressed and shipped in barrels. In examining these mines and dressing department one cannot help admiring the system that is carried out in each section of the operation. The practical working of the mines are under the charge of the engineer and his assistants. At the dressing-house the manager, inside the house, is responsible for the proper dressing of the ores. The assayer has his own department, and takes samples of the ore from the different machines and tables; the waste also is carefully assayed. Your readers are no doubt aware that the Vieille Montagne Company is the first company in the world, and well earned the prize awarded them at the great Exhibition in Paris; as I presume that no other mining company pays such attention to the officers and labourers, socially and morally, as this company does. Children are provided with schools on the mines; hospitals for the sick, and a home for the aged is one of their institutions.

Anyone interested in mining, and wishing to see a Model Mine, would be well repaid by a visit to these mines, and no more pleasant trip could be selected in the summer than a visit to Sweden. The mines can easily be reached by water from Gothenburg through the canal and lakes, affording a splendid view of several falls, besides passing through the two largest lakes in Sweden. WM. HOSKIN.

Mining Office, Orebro, Sweden, Dec. 1871.

MINING ON THE RHINE—No. XIII.

SIR,—Truth and justice alike demand that "A Rhinelander," whose letter appeared in the Journal of the 30th ult., before publishing in your paper of world-wide circulation; statements calculated to mislead the public and to prejudice private property, should have made himself master of the facts, and stated only the truth. First, "A Rhinelander," in reference to St. Josephsberg Mine, says—"I learn by enquiry that the so-called by him (your correspondent) celebrated and rich St. Josephsberg Mines, instead of paying the enormous dividends promised are not returning mineral enough to pay half the working expenses." Had "A Rhinelander" wished to state the simple truth he would have said that the St. Josephsberg Mining Company, having before them the reports of Freiherr von Hüne, principal inspecting agent of, and toller for the Prussian Government, and of Herr Dismann, another of the Crown agents, extending from February, 1866, to Feb. 20, 1867, on which last day a special report was made by Freiherr von Hüne, under the provisions of the General Mining Laws of Prussia, as well as the returns of ore, extracted from the books of the company, which showed that the mine had been immensely rich at and above the 85 lachter level, decided on erecting an engine of 60-in. cylinder, and sinking a shaft to the 120 lachter level, and then driving cross-cuts to and levels under the rich courses of ore left in the bottom of the 85 lachter level; that the St. Josephsberg Company are steadily carrying out their purpose; that they are doing no work beyond sinking a perpendicular main engine-shaft, which is now 80 lachters deep; that instead of not returning mineral enough to pay "half their working expenses," they are not attempting to raise one ounce of ore. This expression "not returning mineral enough to pay half their working expenses," proves either that the expression "but sad to say, I learn by enquiry," in as far as the "sad to say" is concerned, the sadness is sheer hypocrisy, and whilst the second term in the sentence, "I learn by enquiry," incorrect; whilst the "not returning mineral enough to pay half their working expenses" is an attempt to injure the property by an insinuation that ore has been sought for and not found, the truth being, as before stated, that the only work in progress is sinking of the engine-shaft.

This mine has been regularly reported on from February, 1866, to February 20, 1867, by Freiherr von Hüne, the report at the last date being special to his Government; over the same period by Obersteiger Mühlenbein, his reports being to his then employers; by Herr Dissmann, for his Government; by Captains Stephens, Glanville, and Richards; and I ask "A Rhinelander," are not the official reports of the Government agents, the resident captain of the mine, entered in the cost-book, and the reports of the three last-named Cornish mining agents as much to be relied on as those of the gentlemen intended to be advertised by his letter of the 22d, and by that published a few months since in the Journal? "A Rhinelander" is regardless of the accuracy of his statements since he proceeds to write, "and as to the celebrated and rich Phœnix lead and silver mines, the last account I heard is that the bailiffs are in possession, and that Capt. Richards, the manager, who had promised the company such handsome profits, had not been seen in the neighbourhood for some weeks." Now, the fact is that the bailiffs are not in possession. That Capt. Richards, instead of not having been seen in the neighbourhood for "some weeks," has ceased to be manager for about a year; that Captain Andrews was appointed in his place, since which Herr Klöver has been manager, and for the last six months the mine has been managed by Herr Jäger, under the direction of the Herren Meurer. Before this property was purchased it was inspected by Capt. Thomas Rickard, the mineral inspecting agent of Messrs. John Taylor and Sons; by Capt. Thomas Trevillian, of Herodsfoot Mine; and by Capt. S. Richards, the late manager. The inadequate capital, and the delays and expenses by the late war, and not the poverty of the mine, were the causes of its suspension, as is evident from the following extract from the report of Herr Mülenbein:—

"From the 41 lachter level about 43 lachters have been driven north-east to cut, the lode on the eastern side of the eastern cross-course. When I was last on the mine it was my opinion that by a moderate expenditure a fine lode would be discovered. The work recommended by me has been done, and a splendid lode cut fully 15 ft. wide, carrying 18 in. of blende, and 9 in. of clean lead."

Herr Höller, the Government markscheider, or mineral surveyor, on Sept. 8 last reported on this mine:—

"As directed, I have surveyad the mine and completed the plans of the underground works, and enclose tracing of the 41 lachter level, driven north, by means of which the lode has been discovered east of the cross course, which at once constituted your lead mine one of the most valuable mineral properties in Germany."

He then proceeds—

"The 41 lachter level must be extended east on the course of the new discovery, where the lode is fully 15 ft. wide, and carries a leader of blende 18 in. wide, and 9 inches wide of clean lead ore. As the lode has been cut at two points to the east, the more distant of which is at least 700 lachters to the east of the new discovery, carrying lead up to the surface at two places, the value of this piece of lead ground can scarcely be over estimated."

Both of these agents speak in equally strong terms of the lode between the cross-course, the Onyx lode, and the Lux and Ajax lodes. The Menzenberg Mine, also referred to, needs only to be seen to prove its value. Were I in the position of the two gentlemen of Cologne referred by "A Rhinelander," my exclamation would be, "Preserve me from my friend." OUR CORRESPONDENT.

MINING IN CALIFORNIA—THE GENERAL LEE, &c.

SIR,—As large amounts of money have been recently invested by English mining capitalists in this portion of the State of Nevada, a brief sketch of their last purchase may contain some information of interest to these gentlemen in particular, and possibly to a large majority of your readers.

The English public is already tolerably well acquainted, through the medium of the *Mining Journal*, with the mines at Mineral Hill, White Pine, and also some claims in this district, the Richmond Mine to wit. Their last purchase, and in my opinion their best, is that of the General Lee Consolidated Mines. After a careful examination, I am now prepared to furnish the following facts regarding this fine property.

The General Lee Mine was discovered in October, 1869, and a claim of 1600 ft. taken up. The Wide West, about the same time, claiming 800 ft.; the Stonewall, 1000 ft.; Consort, 1600 ft.; and Webfoot, 600 ft., making in all 5600 ft. of what is now well-developed mining ground. The hill in which these mines are situated consists chiefly of a peculiar kind of dolomite, or limestone, and is identical in formation with the enclosing rock of the Richmond and Eureka Consolidated Mines, and also with that of the famous argentiferous deposits of Zacatecas and Batopilas in Mexico, and with several of the most productive silver mines in Chili.

The General Lee claim, upon which the largest amount of money has been expended in the way of developments, was first explored by a tunnel which was started on the slope of a ravine near the southern boundary of their ground, and at a point where the outcrop of the vein was most prominent. This tunnel, which has followed the lead for a distance of 200 ft., has exposed along its entire length a true fissure vein of an average width of 4½ ft., with smooth and well-defined hanging and foot walls, and carrying the clay-streak or flookan, always considered by miners as a never-failing indication of a permanent lode. As the outcrop of the vein was very distinct along the surface of the ground, not the slightest difficulty was experienced as to the points at which shafts should be commenced for the purpose of developing the northern portion of the claim. Consequently three shafts were started almost simultaneously, and at such distances as would fully prove the continuity of the vein followed in the tunnel for a distance of about 1100 ft. All of these shafts have been sunk on the lode itself, which is almost perpendicular, its dip to the south-west being scarcely perceptible. The regularity of the vein, as regards width, dip, and value per ton of ore in the precious metals, is very remarkable. The discoverers, in order to fully test the actual value of their property, as well as to supply the funds necessary to defray the great expenses of the works they were carrying on, shipped to various reduction works at an enormous expense 250 tons of ore, taken without selection from the tunnel and the various shafts referred to. This parcel of ore was sampled into two lots, comprising 100 tons of first class and 150 tons of second class ore. The former gave the extraordinary average of $280 per ton in silver, and $10 per ton of 2000 lbs. in gold, by ordinary mill process. The second-class rock varied from $89 to $125 per ton, and contained about 1½ per cent. of lead. Fully satisfied with the extent and richness of their northern mines, attention was now turned to those south of the ravine formerly alluded to, and across which the lode was traced by means of a number of open cuts and other surface workings, until a bold outcrop was reached about 600 ft. south of the Lee tunnel, and here, on the Wide West claim, work was vigorously prosecuted at several different points similar to that done on the General Lee. The owners were richly rewarded for their outlay—the vein developed in the Wide West claim being fully equal in every respect to that of the Lee. But 147 tons of ore from this mine were shipped for reduction, and the handsome average was given of $95 per ton in silver, and $60 per ton in gold, making a total of $155 per ton, with 6 per cent of lead.

Such extraordinary yields as the above, from 397 tons of unassorted rock, could not fail to attract the attention of mining capitalists in San Francisco to the property, and an English gentleman, Mr. Robt. Barton, one of our most distinguished mining engineers, visited the district, and carefully examined the property almost daily during the three months he spent among us. Mr. Barton, whose long experience in Mexico and on this coast was of especial value to him in this limestone region, having fully satisfied himself as to the value and permanency of the mines, immediately concluded the negotiations he had opened with the owners of the property for its purchase. I have been unable to learn the exact figures at which the sale was made, but understand they were far below the actual value of the ground. It is the intention of Mr. Barton and his associates to erect reduction works early next spring, and work together as a private company. It is not their intention to incorporate, or to subject their property to the fluctuations of the stock market. Under the new owners, a large force of men has been employed, and the developments made on the General Lee, up to their extreme northern limit, and to a point about 1500 ft. distant from the mouth of the tunnel, have been such as to astonish the old miners of this State, accustomed though they be to see very rich silver ore.

The location of the district, its distance from the Pacific Railroad, the cost of transportation of mining machinery, rates of miners' wages, value of fuel and supply of water are all important points, and can be briefly summed up:—miners receive $4 per day; freight from the railroad (about 80 miles) is at present $20 per ton; but this item will be reduced one-half when the narrow-gauge railroad is completed next year, and by which means the district will be brought into direct communication by rail with San Francisco and New York. The supply of wood and water is abundant; the former worth $6 per cord of 128 cubic feet. The total cost of extracting and transparting the ore to the point selected for the location of the mill will not exceed $4 per ton; cost of reducing and extracting the precious metals will not exceed $17 per ton; and by mill process ore is now worked up to within 8 per cent. of the assay value. These figures, which are strictly correct, will leave a splendid profit to the fortunate owners, and doubtless, under the able management of Mr. Barton, the General Lee Consolidated will prove one of the most valuable pieces of mining property on the Pacific Coast.

Eureka City, Nevada, Dec. 12. W. G. KELLY, M.E.

THE SWEETWATER MINES, WYOMING.

MINERS' DELIGHT EAST.

SIR,—The original location of the Miners' Delight Mine was made by a number of prospectors in 1867, and consisted of 1600 ft. After a time it was found desirable to diminish both the number of feet and the number of partners. A division was, therefore, decided upon, a number taking 800 ft. west of an established line of division, and the others taking 800 ft. east. A former letter has treated of the west end of this mine, and it is my purpose to make the east end the subject of this sketch.

Of the situation of the mine it is unnecessary to speak, as it would be simply a repetition of a portion of the west end description; it may, however, be advisable to state that it is in close proximity to Hamilton City, the military post of Camp Stambough, and the other mining towns of this section. The vein proper is situated in the granite and slate formation, and has shown itself to be a true fissure vein.

The developments upon this end of the mine are as follows:—The main shaft is sunk to a depth of 60 ft., and an air and escape shaft is of the same depth. From the main shaft the upper level, running east, is 72 ft. in length, and at the bottom a similar level east 80 ft. in length; also, one level running from the bottom of the main shaft, 50 ft. west. This level connects the main and air shafts. The main shaft is 9 ft. by 4½ ft. in the clear, and is heavily and permanently timbered, with complete slide and ladder-way. The air-shaft is also well timbered, and contains a ladder for use as an escape.

The expense heretofore experienced in procuring the timber and lumber necessary for the protection of the mine is now obviated, as the slate walls have assumed so firm a consistency that heavy timbers are no longer necessary for its support. The levels are 6 ft. by 4 ft., and are protected, where the ore has been stoped out, by heavy stalling and lagging. Altogether, the mine is in better shape than any in this section of country, not only so far as looks are concerned, but for permanent work. The vein exposed by the shaft, which follows the vein at an incline of about 75° south, and as also exposed by the levels both east and west, will average 4 ft. in width. The ore is fine grey quartz, containing free gold, which can be seen in the ore even before it has been mined. Specimens of free gold quartz abound in the greatest profusion, and the mine is noted as having supplied more cabinets of mining, both at home and abroad, than any mine in the country. The average yield of the rock from the surface to the present depth has been about $20, but the vein exposed by the lower level contains ore which will average $50 per ton: 800 tons of the rock have been crushed from this mine, which yielded an average of $20, or thereabout. There is now in sight, disclosed by the different levels, about 1000 tons of quartz, of the same character as that crushed. The cost of mining 1 ton of this ore is $1, and $3 more for reducing, making the entire cost $4 per ton. A 20-stamp mill will reduce 30 tons per day. Allowing the ore to yield $20 per ton, and cost $5, all told, for mining and reducing, gives a net profit of $15 per ton, or $450 per day. The ore is a loose, shelly quartz, easily mined, and I am informed by the manager that in mining the levels but one blast of powder was used. No powder is used whatever in stoping the ore.

In close proximity to the mine is an immense quantity of suitable timber, both for fuel and buildings; also, there is plenty of water for mining and milling purposes; in fact, were the shaft sunk to a depth of 150 ft. it would supply sufficient water for all purposes.

The west end of this property is now in full operation, with the ore at a depth of 140 ft. yielding from $30 to $80 per ton. All that is required to make this east end of the Miners' Delight one of the best paying mines in the United States is sufficient capital to erect the necessary hoisting and reducing works, and from the day the mill would commence operations the foundation would be laid of a record which when completed would be unsurpassed by any mine in America.

South Pass City, Wyoming, Dec. 18. M.

"THE SCIENCE OF INVESTMENT."

SIR,—There unhappily exists no records of the capital embarked in mining enterprises, nor can we arrive at even an approximate estimate of the money involved. To compare mines with railways is absurd, yet I may fairly state that the former absorb scarcely 25 per cent. of actual expenditure on the workings that our railways have cost us—530,000,000*l.*; still, we are enabled to refer with some degree of accuracy to the revenues of our mines, and contrast them with our railways. Our mines yield us over 40,000,000*l.* annually, against 47,500,000*l.*, the total receipts of our railways for the year just ended—a sum equal to 9 per cent. on the 530,000,000*l.* expended As regards railways, whether free trade was or was not the best principle to be adopted in 1845 need scarcely, at the present time, to be debated; the more pertinent enquiry concerns the expediency of the opposite course—amalgamation or protective, instead of competative, conduct on the part of "boards" of rival companies. The receipts of last year year were fully 3,000,000*l.* in excess of those for 1870, which had already exceeded by 2,000,000*l.* those of 1867. There is some increase of expenditure on the other side, but the proportions appear to be all in favour of the railways. The average cost of working two years ago was 49 per cent., and last year it was reduced slightly under 48 per cent., so that the gross gains of our united railway investments exceed 4½ per cent., or (say) 24,700,000*l.* annually. The quotations in the share lists clearly show the growing and favourable estimation in which railway property is held. Trunk lines are all but completed, and the theory of branches is pretty well understood. Improvements are to be looked for in traffic, revision fo existing working arrangement, and in the application of receipts there is any amount of advantages to be gained; so that the future is fraught with every prospect of increased dividends. All feel that with ordinary prudence, absence of unnecessary competition, with friendly exchange of mutual accommodation, and in the absence of monopolies, the public interests can be consulted, and the gains become enormous on our 530,000,000*l.* invested in home railways.

It is not so easy to discern the gains of our mining pursuits as it is to discover the present position and the future of our railways. Consols and the Funds stand first in our investments, railways next, and unquestionably mining third, for it is monstrous to regard joint-stock banks and finance companies in this go-a-head country otherwise than as speculative concerns and adventures. We are, and shall for the future, be subject to periodical and unexpected panics and monetary disarrangements. These have and ever will affect this character of property; hence mining, which in no respect is more hazardous, is most worthy the attention of the investing public. Wherein in joint-stock banks can such instances of substantial and rapid gains be shown as in Tincroft, Carn Brea, Dolcoath, Cook's Kitchen, Botallack, South Caradon, or Par Consols? These mines were at work and prosperous before the London and Westminster or Joint-Stock Banks were even in embryo, and will continue in existence when half of those created within the last ten or twelve years are wound-up in the Court of Chancery. The leading banks, however, will give good dividends during the current month for the past half-year.

To make mining pay earnest application and investigation is required, as is the case in every other branch of industry: the student of the science of investments should study his subject—intelligence, nerve, and money are alone required to make mining pay. Market dealings and popular companies do not necessarily imply good and profitable mines. Capitalists in Cornwall availed themselves of the long-existing pressure on speculative enterprise, and secured the valuable shares, at ridiculously low prices, which the public held in

most of their valuable best mines. At one time five-sixths of Tincroft shares were held by absentees, now Cornwall has reversed the position, and the mine is making profits of 1000*l.* a week! We rarely hear of a Dolcoath share being sold in London, yet Grenville or South Condurrow are ever changing hands, and constantly advocated as investments. Again, there is Trumpet Consols, a long-established, sound dividend and ably managed tin mine, rarely if ever dealt in upon the London market, that can be purchased to pay 16 per cent., but yet "Van" sells for 700,000*l.*, paying only 5 to 6 per cent. East Llangynog is foisted upon the public at 150,000*l.*, paying nothing; whilst Botallack sells at 50,000*l.*, and is one of the staunchest and soundest dividend tin and copper mines of Cornwall. Instances innumerable may be brought forward, but we drop comparisons, as those given will suffice to satisfy the earnest and intelligent investor that observation, enquiry, and discrimination are as needful as money in mining, as also it is in every other description of property. During the ensuing ten days I shall be on a visit of inspection in Cornwall, and parties interested in the mines west of the Tamar can receive an independent report, with correct data and intelligence, upon application to me at Camborne, Cornwall.

R. TREDINNICK,
Consulting Mining Engineer.

3, *Crown-court, Threadneedle-street, London, Jan.* 10.

MINERAL RESOURCES OF IRELAND.

SIR,—It is hardly needful to notice the ill-advised letter, signed Geo. Davey, in the Supplement to the *Mining Journal* of last week, the writer so convicts himself in having told an untruth in his letter published in the Journal of Dec. 23, wherein he stated he had been a mining "captain" at the Knockmahon Mines, in Ireland, such not being the fact, upon his own confession in his letter of Jan. 6. How can anyone believe his assertions of there being the untold wealth and large deposits of iron ores in the Curraine Estate as he represents there are? Better far for the owner of the estate to dispense with the advocacy of such a self-convicted authority in supporting his assertions by an untruth, and for the investing public to avoid being led astray by false representations made by an interested party.

VERAX.

TIN MINING IN CORNWALL.

SIR,—In the Supplement to last week's Journal your correspondent, "A Cornishman," in cautioning investors against re-working old mines, and his particular caution to a "party," looks to me as if it were done to serve some private pique. I quite agree with him that great care should be taken to get the advice of respectable and experienced men as to the advisability of re-working old mines, and I think the same advice will hold good with regard to new mines, or, indeed, to any other branch of business.

Any person at all acquainted with Cornish mining must know that nearly the whole of the most profitable mines have been worked, abandoned, re-worked, and some re-re-worked before they have been brought into a dividend-paying state. The mine named Cornubia is only 70 fms. deep from surface—a comparatively shallow mine. The loss of 26,000*l.* during the last working, and the mine only sunk 10 fms., proves that it was very badly managed.

As "A Cornishman" has given some facts for the information of the "party," I should also like to bring before their notice a fact which "I have reason to believe they know nothing of"—that there was sold from this mine during the last two years and a-half of its working 130 tons 15 cwts. 1 qr. 31lbs. of black tin, which realised 8646*l.*—*Jan.* 10.

J.

[ADVERTISEMENT.]

TERRAS TIN MINING COMPANY, AND ITS MANAGEMENT.

SIR,—Several shareholders in this company, who are not regular subscribers to the *Mining Journal*, have forwarded to us copies of the letter by "A New Director," and desired us to furnish them with a copy of our "strictures," which appeared in your impression of Dec. 9. As Mr. W. S. Pearce announced that he would pay no attention to any anonymous letters, we are surprised that he should "have deemed it his duty" to circulate copies of the one signed "A New Director," and we submit that it would have been more fair both to us and the shareholders had he furnished copies of both, and thus have enabled the latter to have formed an unbiassed opinion. Some of the shareholders have complained to us that when they have written to Mr. W. S. Pearce for information he invariably ignores the most important questions, and answers others in the most evasive manner. His letters, which have been shown to us, abound in unqualified abuse of our firm, accusations against us not in accordance with truth, verbose assertions of the value of the property, and the honour and integrity of all concerned in the management, and conclude—"Should you desire any further information I may refer you to the Rev. A. Taylor, D.D., of Dundee, or C. M. Barstow, Esq., of Edinburgh." Now, we would ask Mr. W. S. Pearce a plain question—Having been the secretary of the company from its formation, why should he so studiously endeavour to avoid responsibility, and strive to thrust all onus upon two gentleman, who, we perceive by the report of the meeting, are the new directors, and who live at such a long distance from the mine? Perhaps Mr. Pearce will also kindly inform the shareholders who may avail themselves of his reference what is the nature of the experience which has qualified a Doctor of Divinity and a gentleman of whose occupation we are in ignorance to constitute themselves reliable advisers upon mining speculations? We cannot suppose that he would refer shareholders to these gentlemen without having first obtained their authority.

The letter of "A New Director" is very clever, but its evasive nature is the best proof of the sound foundation which existed for what he terms "our strictures on this company." His undoubted talent could easily have clearly refuted our statements had they been unfounded; but, as an answer to our letter of Dec. 9, it is simply a failure, for he admits the truth of all our assertions, but differs with our opinion of the commercial principles which we maintain should always be observed in business transactions. Some of his assertions are obviously incorrect; but we are charitable, and believe them to have been prompted by ignorance of practical mining, and not wilfully intended to mislead the public. The statement made in the first paragraph of his letter is perfectly correct. Marlborough and Co. only hold "a very slight interest in the Terras Mine," and we hope never to have more shares in our name than will qualify us to obtain such information as should be voluntarily furnished to all shareholders by a respectable board of direction. We doubt if any stockbroker or sharedealer be a *bona fide* proprietor of shares in this company. They are all too well acquainted with the value of such a "prize."

"A New Director" appears to have formed the opinion that Articles of Association can overrule an act of Parliament, but he may before long be convinced of his mistake. If the management of the company has been perfectly straightforward, what motive could have existed for the concealment from the shareholders of the important facts which we have brought to light? As we are pressed for time we must content ourselves with asking "A New Director" a few questions, and by his answers the public will be enabled to judge of his fitness to direct a public company:—

1.—Has a full, accurate, and intelligible balance-sheet and accounts of assets and liabilities for the year ending June 30 been forwarded to each shareholder, either before or after the general meeting?

2.—Does he not think that each proprietor is entitled to receive such a balance-sheet and all information necessary to form a correct estimate of the value of his property?

3.—If such a balance-sheet has not been forwarded to each shareholder, what motive had the management in departing from such a general custom and withholding it?

4.—The agreement, dated March 4, 1870, was not filed at the Registration Office unfil the 17th. If the discrepancy between the two agreements, both bearing the same date, be "only apparent," and "it was at first intended to have only 100, but afterwards it was provided and arranged that there should be 200" heads of stamps, what was the motive for filing the one which only binds the contractor to erect 100 heads of stamps in preference to the other binding him to erect 200, and from which an extract was published in the prospectus, and inserted in the Articles of Association?

5.—Does the agreement which was not filed contain any clause by which the contractor, having erected certain machinery, and brought the mine into a dividend-paying state, shall be entitled to all the shares which shall then remain unsold—and is this the reason the management are in such haste to declare a dividend?

6.—Does he think that the public would have invested their money in the shares had they been informed that the contractor was to receive the whole of the capital?

7.—What guarantee has the management exacted from the contractor to ensure the satisfactory completion of his contract?

8.—Who has been appointed to arbitrate should the question arise whether the contract has been satisfactory completed—was it a former servant of the company?

9.—Why have the shareholders not been informed of the amount of salaries paid to the officials and the general expenses of the establishment?

10.—If "another level is to be driven 10 or 12 fathoms under the great adit, which will effectually drain the elvans so that their tinstone will be obtained without the use of machinery for many years," why has money been wasted in erecting expensive steam-engines, and are any of them used for pumping?

11.—Is it true that the contractor was bound to erect 200 heads of stamps, and that "he is doing so faithfully and beneficially, with all convenient speed"—if so, will "A New Director" inform us whether, as appeared in a letter published in the Journal by the managing director, there were 48 heads of stamps in full work in June, 1870, and whether there was an additional head of stamps at work at the date of his letter—Dec. 23, 1871; if not, is this the realisation of his idea of "all convenient speed?"

12.—What is the number of additional heads of stamps which "will be in operation in a few days"—and by what calculation does he estimate that they will stamp 100 tons per day?

13.—Does Clause 79 in the Articles of Association state that "the office of director shall be vacated if he is concerned in or participates in the profits of any contract with the company," or "if he participates in the profits of any work done for the company"—and is not Mr. Martien both the contractor and managing director of the company?

14.—Does he think such a combination of offices calculated to promote the general interests of the company?

15.—Is it true that the contractor has leased additional lands and paid the expense out of his own pocket, or will the money eventually come out of the capital of the company?

16.—Does clause 82 in the Articles of Association state that "the company may, with the sanction of an Extraordinary General Meeting, purchase, lease, or acquire any lands, mines, or mineral property; but no such purchase or lease shall be made of any director or officer of the company without the express sanction of the meeting which sanctioned such purchase or lease;" has such an extraordinary general meeting been held, and, if so, at what date; and, if not, for what reason?

17.—What has been the amount of each monthly cost-sheet since May?

18.—Is it true, as stated at the meeting, that 110 men are employed upon the mine, and, if so, how is it that only 2000*l.* have been expended since the end of June? The cost of labour alone ought to have amounted to more than that sum.

19.—Have skill and experience been exhibited in the choice of a site for the stamps and dressing-floors, and may they be considered in an efficient state for returning the tin in the most economic manner?

20.—Where did Mr. Martien obtain his experience to qualify him for such important and responsible offices as contractor and managing director of the company, and in what mines did Capt. Rickard obtain his practical experience of tin ores?

In conclusion, we have only to state that the "Holder of One Thousand Shares" has not accepted our offer of 100 shares at 28s., and that several of our letters, in which we accepted offers from pretended buyers of these shares have been returned through the Dead Letter Office. W. MARLBOROUGH AND CO.

Bishopsgate-street Within.

OLD LLANGYNOG AND WEST LLANGYNOG MINES.

SIR,—I thought after the letter signed "Miner" that "Observer" would have reflected over his absurdities, and tried to become a better man, and not have written what appeared in last week's Journal. Knowing both parties, I think it my duty to give a short history of each.

1. I have known the gentleman who signed himself "Miner" from my childhood up; and by his industry, integrity, and sobriety he retained the management of one of the principal mines in this district (I may say in the Principality) for over 20 years; and as the fruits of his honest labour he is now farming his own freehold estate close by, and also bringing his practical knowledge to bear in developing the mineral resources of the same, from which development I believe great results will be realised, and employment given to the surrounding population.

2. The party signing himself "Observer" came into this district about three years since, and was employed as an agent of a mine, and great results were expected of him. Perhaps "Observer" will have the moral courage to inform the readers of next week's Journal what caused him to be discharged from the mine?—*Llangynog, Jan.* 11.

X. Y. Z.

WEST MARIA AND FORTESCUE.

SIR,—Law! Law! Law! The "committee" would appear to be fond of Chancery suits, as they have decided to fight Mr. Willisford in every court to the "bitter end." This is another "Basset and Frances case." Their last application to the judge was dismissed with heavy costs. After repeated failures in the vain effort to force Mr. Willisford back on the arbitration clause contained in their lease, they have not learned wisdom by their defeat, nor have they yet filed their answer to the Chancery proceedings commenced against them nearly two years ago. The expenses already incurred by the committee must be enormous, and the "lamb-like shareholders" may expect a 5*s.* call every four months for some time to come, as the prospects of the mine are not at present sufficient to warrant the possibility of meeting more than one-half of the total current expenses of working and management. It is to be regretted that some compromise between the parties is not attempted, especially since Mr. Willisford has given every opportunity for the committee to ask for an amicable settlement.

MAGNATE.

RICHMOND CONSOLIDATED MINING COMPANY.

SIR,—I see in last week's Journal a statement to the effect that "Richmond Consolidated shares had fallen, although the directors had received no unfavourable news." This is contrary to fact; although it is the answer returned to those shareholders whose fears are excited by the fall in the price of the shares, and who may enquire the reason at the company's office. The real cause I believe to be is that a dispute has arisen as to the ownership of the property, and that two members of the board have started for America to support the cause of the Richmond Consolidated Company in the action brought against them. It is much to be regretted that the board should have decided to withhold such important information, which must soon be generally known. We have had instances enough of withholding the truth, and I think it but right that the shareholders should know what is really the matter, so I trust you will give publicity to this.—*London, Jan.* 11.

ONE WHO KNOWS.

[For remainder of Original Correspondence see to-day's Journal.]

COMPRESSED AIR AS A MOTIVE-POWER.

SIR,—In reading over the columns of your valuable Journal the last few weeks we might be led to believe that compressed air was something new; I know that it was used in Australia 11 years ago to pump water out of a gold mine. We have a compressed air-engine at work 30 lbs. to the square inch; it is taken down an incline 500 yards, where it drives another engine, and pumps the water out of some old workings, and forces it up to the top of the incline, a rise of 50 ft.—*Jan.* 11.

AVANCE.

[For remainder of Original Correspondence see to-day's Journal.]

Meetings of Mining Companies.

EAST POOL MINING COMPANY.

A general meeting was held on the mine on Monday—Mr. JAMES DENNIS in the chair.

The notice convening the meeting was read, and the statement of accounts presented showed a credit balance of 1621*l.*, and a profit on the three months working of 1607*l.* 17*s.* The subjoined report of the agents was then submitted:—

Jan. 8.—Great Lode: The 180 is driven east from the engine-shaft 16 fms., and is worth for tin 20*l.* per fm. The 160 is driven west 18 fms., and is worth 20*l.* per fm. There are two stopes in the back of this level worth 20*l.* per fm. each stope. Both ends and stopes are still free from wolfram. The 170 east and west continue the same as reported at the last account. The winze sinking below the 170, 20 fms. west of the engine-shaft, is down 8 fms., and is worth 24*l.* per fm. The 160 west is driven 3½ fms. since the last account, and we hope before the next account it will be under the winze sinking below the 130; the lode in it is small, but contains a little tin. The winze is down 28 fms. below the 150, and in very hard ground, producing low quality tinstuff. There are six stopes in back of the 170, three east of cross-cut worth 18*l.* per fm., and three west worth 14*l.* per fm. each stope; and there are three stopes in back of the 160 worth 16*l.* per fm. each stope.—Engine Lode: The 170, west of the cross cut from engine-shaft, is worth for tin 6*l.* per fm. The 150, west of eastern cross-cut, is worth 16*l.* per fm. The 140, west of Dennis's cross-cut, is worth 12*l.* per fathom. Two stopes in back of the 170 are worth 18*l.* per fm. each stope.—South Lode: The rise in back of the 150, on the cross-course, is up 5 fms., and is worth for tin 8*l.* per fm. The 140, driving south from the engine lode to intersect the south lode, is in about 15 fms., and is still in killas ground, and favourable for driving. The 130 is driven east of the western cross-cut 40 fms., and is worth for tin and copper 15*l.* per fm. The winze over this end, sinking below the 100, is down about 8 fms., and producing a little tin. There are two stopes working in bottom of the 130, worth for tin and copper 25*l.* per fm. each stope.—W. S. GARBY, manager, JOHN MAYNARD, JOHN HOSKING.

Upon the motion of the CHAIRMAN, seconded by Mr. WM. SYMONS, the report and accounts were adopted, and a dividend of 1600*l.* (5*s.* per share) declared, leaving 21*l.* to carry to credit of next account.

EAST WHEAL SETON MINING COMPANY.

A meeting of shareholders was held at the account-house, on Wednesday,—Mr. THOMAS PRYOR (the purser) in the chair.

The accounts for the three months, to end of October, showed a balance against the mine of 821*l.* 2*s.* 10*d.*, and a call of 841*l.* 5*s.* (or 3*s.* per share) was made.

Capt. PASCOE (the manager) read a very favourable report of the mine, and, in reply to several shareholders, said he was much pleased with the lode in the bottom of the 34, at Cartwright's shaft, where it was worth fully 3 tons of good copper ore per fathom. They had the same elvan course as they had in the adjoining mines of Wheal Seton and West Seton, and, as they were also on the same lodes, he had no doubt by continuing their shafts in East Seton that good results would follow. The shareholders, he said, had only to look at the pile of ore now on the floors to be convinced that, ere long, they would be able to vie with their rich neighbours.

The meeting was largely attended, and terminated with the usual vote of thanks to the Chairman.

TRUMPET CONSOLS MINING COMPANY.

A meeting of shareholders was held on the mine, on January 4, Mr. HENRY ROGERS in the chair.

The usual preliminaries having been disposed of, the statement of accounts, showing a credit balance of 2455*l.* 9*s.* 1*d.*, was submitted, and the subjoined report of the agents was read:—

Jan. 4.—Wheal Valls: The new shaft is sunk to the 153, and we have just commenced driving east and west. The lode in the shaft has been in two parts, and not very productive, but in driving west the branches are coming together, and we expect an improvement, as there is a good run of tin ground gone down from the level above, a few feet before this end. We expect to have some fathoms to drive the 163 east before we reach the tin ground gone below the 153 east. The 153 has been driven west since last meeting 8 fms., 4 fms. of which were through a lode worth 25*l.* per fathom; the last 4 fms. have been through moderate tin ground. The 153 east has been driven 3 fms., through a lode worth 4*l.* per fm.; this can be stoped at 1*l.*—Wheal Noon: We are working on a short run of tin ground below the 60 east, which is leaving a little profit on this part of the mine. We are driving the 85 east, and expect to reach this tin ground shortly.—Franchis: The flat-rod shaft is sunk 9 fms. below the 105; lode worth for length of shaft (12 ft.) 35*l.* per fathom. The 105 has been driven west since last meeting 10 fms., through a lode worth on an average 40*l.* per fathom.—Wheal Dream: The engine-shaft is sunk to the 240, and we are driving east and west. East the lode is not so rich as it was in the shaft, but in the western end it is worth from 30*l.* to 40*l.* per fathom. The 180 has been driven west 4 fms., through a lode worth 7*l.* per fathom. The stopes in the back of this level are just as productive as for some time past, worth from 18*l.* to 20*l.* per fathom. We have had a bar of hard and poor ground in the 180 east since last meeting, but, from the appearance of the end at present, we expect an alteration shortly. The mine, on the whole, is looking much the same as for some time past.—RICHARD QUENTRALL, JAMES ROWE, JOHN GLUYAS.

The reception and adoption of the report and accounts were unanimously agreed to, and a dividend of 2000*l.* (10*s.* per share) was declared, leaving a balance of 455*l.* 9*s.* 1*d.* to carry forward.

The meeting expressed its approval of the gratuity presented to the miners Christmas, and of the abolition of the five-weeks month.

It was resolved that the East Trumpet sett be taken from Michaelmas next, and that the manager be instructed to purchase the machinery and materials.

The proceedings terminated in the usual manner.

[For remainder of Meetings see to-day's Journal.]

SALES OF COPPER ORES.

COPPER ORES SOLD AT THE CORNISH TICKETINGS FOR THE QUARTER ENDING DECEMBER 31, 1871.

Mine.	Tons.	Amount.
Devon Great Consols	4121	£12,709 1 6
South Caradon	1410	10,881 18 6
Marke Valley	1441	4,823 12 0
West Wheal Seton	812	4,433 6 6
West Wheal Tolgus	989	4,259 12 0
Glasgow Caradon	880	3,080 3 0
East Caradon	588	2,810 13 6
Gawton	594	2,433 9 6
Crenver and Abraham	521	2,360 4 0
Hingston Down	472	2,328 7 0
Wheal Seton	259	2,110 16 6
East Pool	575	1,828 11 0
South Wheal Crofty	501	1,582 13 6
Phœnix	346	1,568 11 6
Brookwood	295	1,534 17 0
Wheal Russell	363	1,376 16 0
Bedford United	252	1,196 7 6
Prince of Wales	234	1,179 7 6
South Carn Brea	177	1,155 8 0
Carn Brea	241	943 3 0
West Maria and Fortescue	230	938 18 6
Wheal Friendship	182	937 6 6
Craddock Moor	141	818 10 6
Wheal Basset	161	802 13 6
East Grenville	252	756 14 0
North Crofty	132	586 6 0
West Basset	158	579 2 6
West Caradon	152	560 8 0
Mellanear	155	477 2 6
North Treskerby	136	472 12 6
New Pembroke	80	396 10 0
Wheal Crebor	103	378 1 0
Gonamena	88	328 13 6
Carn Camborne	74	300 19 6
Bampfylde	20	245 10 0
Levant	20	199 10 0
South Frances	45	172 8 0
Belstone	17	160 13 6
Champion's Ore	32	159 12 6
Wheal Jewell	43	149 0 6
West Damsel	43	142 19 6
Poldice	37	128 11 6
Phillipa's Ore	24	82 4 0
Cargoll	8	81 8 0
North Downs	13	73 9 0
North Roskear	10	73 5 0
Wheal Grenville	8	61 16 0
Franco Consols	10	60 5 0
Wheal Prosper	32	53 12 0
Buglehole's Ore	18	49 19 0
East Basset	12	45 6 0
St. Aubyn United	4	37 6 0
Westlake's Ore	37	37 4 0
South Dolcoath	9	30 16 6
Wheal Agar	6	29 2 0
Virtuous Lady	10	28 0 0
Michell's Ore	8	13 12 0
Tolcarne	6	13 4 0
Tremillian's Ore	2	12 0 0
Moss's Ore	2	7 15 0
Wheal Comford	2	5 16 0

COMPANIES BY WHOM THE ORES WERE PURCHASED.

Vivian and Sons	3928	£14,092	5 4
P. Grenfell and Sons	1594	8 094	1 6
Sims, Willyams, and Co.	1673	9.612	6 0
Williams, Foster, and Co.	4128	22,249	13 7
Mason and Elkington	3198	11,363	16 6
Copper Miners' Company	1755	4,107	8 0
Charles Lambert	430	1,725	11 4
Newton, Keates, and Co.	398	1,738	1 3
Sweetland, Tuttle, and Co.	647	2,769	15 0
Total	17,751	£75,752	18 6

COPPER ORES SOLD AT THE SWANSEA TICKETINGS FOR THE QUARTER ENDING DECEMBER 31, 1871.

Mine.	Tons.	Amount.
BRITISH.		
Knockmahon	887	£ 5,921 9 6
Berehaven	950	5,494 16 0
Total	1837	£11,416 5 6
COLONIAL.		
Cape Regulus	454	£16,102 1 6
Cape Ore	552	13,707 18 0
Moonta	704	8,687 4 6
West Canada	602	8,134 11 0
Australian	80	589 8 6
Paramatta	49	509 12 0
Total	2441	£47,730 15 6
RECAPITULATION.		
British	1837	£11,416 5 6
Colonial	2441	47,730 15 6
Foreign (Sobral)	128	842 13 0
Sundries	1069	7,502 19 6
Total	5475	£67,492 13 6

COMPANIES BY WHOM THE ORES WERE PURCHASED.

P. Grenfell and Sons	702	£ 7,607	16 6
Sims, Willyams, and Co.	469	6,529	2 9
Vivian and Sons	849	7,872	14 0
Williams, Foster, and Co.	2049	23,128	6 9
British and Foreign Company	133	3,135	10 6
Mason and Elkington	492	6,816	17 9
Charles Lambert	336	3,824	9 0
Sweetland, Tuttle, and Co.	445	8,577	16 3
Total	5475	£67,492	13 6

THE TIN TRADE.—Although there is no slackening of competition among the smelters for the produce of the Cornish tin mines, and the smelters in turn find no difficulty in disposing of their supplies on profitable terms, the metal market has for some days lacked spirit, and English tin has been reported flat and lower. The continued extraordinary demand for tin-plates, however, has materially helped a steady the standards, while tin plates have advanced. Men of great experience and accustomed to careful calculation, consider there is no reason to expect a material reduction in the price of tin, and they are further of opinion that a reduction will be only temporary. Speculation, as is the custom at this time of the year, is only to a small extent, and manufacturers, many of whose stocks are undoubtedly very low, are waiting to ascertain something like the quantities to be offered at the Banca sale, and also to see if the consumption gives signs of reduction. At present there is every likelihood of the Banca sale being considerably below the average. The Trading Company have yet some time before them, but not much, and then they must make use of the new line of steamers to Holland, but it is believed in Cornwall that despite all efforts the sale will a good deal under the tho mark, and so lead to higher prices. The quantity reported to be in stock and afloat belonging to the Trading Company is somethi like 54,000 slabs, against 75,000 slabs as the average of many years. Messrs. Sargant and Son, London, have heard a rumour that three steamers will bring about 6000 slabs each, but this arrival is generally regarded as a very u certain affair. The consumption of tin gives promise of an increase rather th a decrease. At the beginning of last year the available stocks of tin were tons, while the new supplies in the 12 months reached 27,593 tons, a total 33,531 tons, and during the year the consumption required 27,052 tons, an precedented quantity. There is no sign of any falling off in demand, but supplies may be reasonably expected to increase. Straits shipments have ahead considerably, and greater things are looked for this year; while in Cor wall the mines are being worked very vigorously, and new and improved more powerful machinery is getting to work at many of the most extensive cerns, with a view to expedition. It must be remembered, too, that several have been started in Cornwall during the last six or eight months, and some of them already promise to yield well, so that the county will, no doubt supply considerably more tin for the market this year than in 1871. It is general opinion in Cornwall that not only will the supply increase but the mand also, and it is well known that nearly all the tin-plate manufacturers booked with orders a long way ahead, and that extensive orders have been clined for a few weeks. Reports tell of a growing demand for America Australia, and of a gradual improvement in French orders. All things sidered, present appearances are decidedly in favour of another prosperous for the tin trade. In the report of the quarterly meeting of the trade, appeared on Saturday, it was stated that the price of charcoal, tin-plates had been advanced to 30*s.* per box; it should have been 36*s.* per box, delivered at the shipping ports.—*The Times.*

ROLLING STOCK FOR RAILWAYS AND TRAMWAYS.—The feature of novelty which constitutes the invention of Mr. ST. JOHN VINCENT DAY, Glasgow, is the arrangement of the carriages upon trucks having each a pair of wheels, the trucks being attached near to each end of the vehicle by a pin or pin, whose axis is at or near to the centre of the axle, so that the axle of its truck may swivel thereon, in order to radiate the axle conformably to contour of the rails.

Royal School of Mines, Jermyn Street.

[FROM NOTES BY OUR OWN REPORTER]

LECTURE XIII.—Having so far in our course (said Mr. SMYTH) passed under review the varied character of the mineral deposits, the methods adopted in searching for veins and beds, and certain operations on them, we will next enquire into some of the preliminary processes which may take the place of the more expensive processes of actual mining. By this I mean "boring," or the putting down by means of proper implements what are called bore-holes, varying in diameter from 1 in. to 1 ft.; although of late years these measurements have been greatly exceeded, and have approached the dimensions of shafts or openings used in actual mining. The depths to which bore-holes are put down vary from 5 ft. to as much as 3000 ft., although, perhaps, the instances in which the latter has been done are few. The object has been to see what was the nature of the rocks below, and in other cases to gain access to subterranean waters. We may divide these bore-holes into four principal classes.

1.—For testing the character of the ground to a small depth—say, 30 to 60 ft.—for the purpose of finding a good foundation for buildings, or to estimate the cost of railroad cuttings.

2.—For exploratory, precautionary, or incidental purposes in mining. In exploring, for instance, to prove the existence, position, and thickness of geological beds, as masses of iron ore or seams of coal found in the North of England.

3.—For relieving the upper workings of a mine from water when it can be tapped off, and also for establishing communications for air, and for the ventilation of certain places.

4.—To afford access to subterranean waters, whether pure for the supply of towns and factories, or brine from which salt is obtained by evaporation.

In the general way boring is accomplished by suspending a cutting tool (called a drill or auger), which will be the size of the bore-hole to be cut, at the extremity of rigid rods or a rope. The tool is then allowed to fall by its own weight, and according to that weight and the nature of the ground the bottom of the hole will be more or less cut. It is then drawn up again to a fixed height, a turn given it so that the edge may not fall on exactly the same spot, and again let go. After a time the bottom will be cut to pieces, the cutting tool is withdrawn, and another tool called a sludger, a kind of scoop, is introduced, and the detritus brought up. This sort of operation has been in use for the last 150 or 200 years in Europe; but it is probable that the Chinese, who seem to have been before us in its use, succeeded long before that in sinking bore-holes to a very great depth. One of the first notices of the process in books is to be found in an old work called the "Familiar Discourse concerning the Mine Adventure," published in 1760, where it was pointed out that great advantages would result from the use of a few rods and chisels. The passage (and a remarkable one it is) is as follows:—"A deep adit was driven under Esgair-hir, a silver and lead mine in Wales, regarded as a Welsh Potosi, being at its deepest part a depth of 64 yards, to which bore-holes were to be made to tap off the water," and the author thus describes the process:—"We have sharp chisels screwed to iron rods of about 4 ft. long, which are also screwed together to what length you please, with which we pounce the rock into a powder, and by continually turning about we keep the hole round, and with the working of the water and the motion of the iron rod the rock or stone, thus beat to dust, will in great measure rise up to the top of the ground and work out of itself; but when the hole begins to be choked we take up the rods, unscrew the chisel, and screw on a borer, with which we cleanse the hole, and then put down the chisel again, and by this means we can bore a yard in a day in a very hard rock." This describes with an almost perfect exactness what the process is now.

I could mention innumerable cases in which borings have been successfully carried out by the ordinary methods on a moderate scale, both as regards depth and diameter. Where it is a matter of only a few feet it is evident that a mere auger will be sufficient to drive through turf, peat, sand, gravel, or clay; and it may be assisted by means of a corkscrew implement where large stones are in the bore-hole, to bring them up to the surface. When the bore-hole gets some depth the screw principle is laid aside, and the work goes on by percussion. This, however, is rarely necessary when the object is only to test the hardness of the ground in estimating the cost of railway cuttings or other excavations, or cognate purposes. When, however, we come to actual mining, and the object is, we will say, to try if certain beds continue in depth, or extend to other places in the same district, the work is of a more formidable character. A remarkable instance of a bore-hole of this kind is that at Creuzot, in Eastern France. The coal beds there are much dislocated, standing frequently upon end, as the miners say, and it was thought necessary to try if a certain bed extended in a particular direction in the deep. A bore-hole was put down to a depth of 1000 yards, through the New Red Sandstone, but failed in reaching the seam they were in search of. Indeed, where stratified beds are distorted and broken it is frequently necessary to put a bore-hole down, to ascertain the nature of the ground below. In the case of irregular deposits exploratory borings are of great value, and in those remarkable hematite iron districts of Lancashire and Cumberland the more enterprising mine managers always keep a few borers at work, searching to a certain depth for new deposits. This is done to such an extent that in one small field there will sometimes be half a dozen bore-holes put down, the deposits generally extending downwards, and not laterally. If, however, we look to what happens in mineral vein districts, we shall see that bore-holes do not come into play. Veins generally have no great lateral extent, and bore-holes would give not the slightest clue to the character of a lode, as it would be a mere chance whether it intersected a poor or a rich part. And the same remark is applicable whether the boring be vertical or horizontal, as regards showing the character of the lode. We must draw, therefore, a strong line of distinction between stratified deposits in which boring is turned to every day account, and lodes in dealing with which bore-holes will not give a fair idea of the ground, and in which they can be but very seldom, if ever, useful. Sometimes, however, in working mineral veins boring is found extremely valuable in facilitating the ventilation of certain places. For instance, when men are working on the rise the obnoxious gases fill the working places, and require a great strength of ventilation to sweep them out. This cannot always be done, and then a bore-hole put down from a higher level permits the escape of the foul air from that particular place into, perhaps, a main airway, which carries it off and leaves the working place free for the workmen. Sometimes the reverse is experienced, and miners working down hill find themselves incommoded and hindered by water. A bore-hole is then put down, and the water tapped off into another level below, from whence it can be conducted to the sump-shaft. It ought to be a far more general practice in our metalliferous mines than it is to have a set of boring rods and the necessary apparatus always at hand. Another class of operations in which boring plays an important part are those of a precautionary nature, which are particularly necessary in many districts in this country, where workings for coal are plentiful. One of the most fruitful sources of accidents in certain districts arises from the neighbourhood of old workings. Places of this kind are generally left full of water—that is to say, the pumping ceases, and the water quickly accumulates, until the workings are filled very often up to the level of the natural drainage. The danger of approaching such reservoirs from below is enormous, particularly as it too frequently happens that no plans of the old workings are to be had. When a mine is abandoned there is at present no obligation upon the owners or managers with respect to plans; but all workings ought to be surveyed up to the last moment, and proper plans made and deposited in some public institution or office for future reference. The older workings are generally the shallower, and so are approached from below. As time passes onward the deposits sought to be obtained are the deeper ones, and in coal mines the bed is generally worked to the rise. When the levels are driven in a direction which it is surmised will approach the old workings the greatest care is necessary. Indeed, a not very recent Act of Parliament makes it obligatory upon the mine managers to carry borings in advance of the workmen. The usual mode of advancing is by two parallel levels. At the head of each level it is usual to put in two bore-holes, one in advance, and the other to the outer side, diagonally.

These must be always kept four or five yards ahead, and in the event of water being tapped a long tapering plug rod being in readiness it is thrust into the bore-hole, and driven home with a large mallet. What is next done will depend upon circumstances. Mostly it will be the wiser course to abandon all further advance in that direction, but if it be believed that the reservoir tapped is not overwhelmingly large the water will probably be drained off by degrees and pumped up. If, however, it could be ascertained, old workings full of water ought not to be approached nearer than 20 yards. There is one danger attached to old workings which may arise even where there are plans and drawings in existence. It frequently happens that sumps are sunk in the deeper parts of the workings for drainage purposes, and are rarely if ever planned when this is the case, or if so at less depths than they should be, and so miners who have plans to guide them fall into a trap, as it were, by means of those very plans, and run great risks of tapping these dangerous accumulations of water. All this, therefore, goes to show that bore-holes ought always in such dangerous neighbourhoods to be put forward, and that the Legislature is right in having made it a legal obligation upon mine managers. There is, however, one quality which the miner should possess in approaching these bodies of imprisoned water which the Legislature could not confer—that is to say, great coolness and self-possession, so that when a rush of water commences they shall be prepared to stop it with the long plug of wood they ought (as I said before) to have in readiness, without becoming confused or panic-stricken. In watery ground natural feeders are sometimes tapped, which are equally productive of danger, and bore-holes ought to be put down in such ground even when they are sinking the shafts. If this be not done, when the water is what is called "quick," it flows into the excavation in such quantities as to overpower the pumping arrangements, and perhaps drown all the workmen. It is not so long ago that a salt mine near Halle, in Saxony, where the main shaft had been sunk to a depth of 700 ft., and where a subterranean body of brine was tapped, that the brine burst in so suddenly that in two hours and a half the mine was completely filled to the top of the shaft. If a bore-hole had been made in this case the mine would probably have been saved. A similar case came under my own observation at the Abercarn Colliery, when 14 persons were at the bottom engaged in sinking, and a sudden rush of water took place, with such violence as to throw the borer out of their hands, although it was 50 lbs. in weight.

We will now look a little more nearly at the nature of the boring tools. The principle on which the apparatus is based is that of a cutting tool suspended by rods or ropes. The ordinary method in this country for deep borings is to use rods, which are about an inch square. They are made in lengths of from 6 ft. to 12 ft., and it is a great point to have them of a good length, so as to dispense with joints as much as possible. These are screwed together with alternate male and female screws, with some special arrangement at the bottom to attach the cutter or auger. The cutter, also called a "bit" (French, trapan), is on its edge most frequently chisel-shaped and straight. The edge, however, is sometimes curved, and occasionally crossed. It is made in various shapes, sometimes devised on the spot by the smith, to deal with special difficulties. The rods ought to be of the very best iron that can be obtained. No economy can be practised by using inferior materials, inasmuch as one of the greatest sources of expense in boring is the fracture of the rods, and by which delays are created not merely of hours or days, but of weeks and months. It is, therefore, of the utmost importance to take every precaution against such accidents. The rods weigh about 22 lbs. to the fathom, and, as I have said, are made in as few lengths as possible, so as to have a minimum of joints.

The next point is the mode of suspending these tools during the operation. Attached to the top-piece of the rod is a handle by which the master-borer can lift the rods with the tool attached, and by simply allowing it to strike will be able to come to conclusions as to the nature of the bottom, aided by an examination of the detritus brought up from time to time. When they have worked down to 100 or 150 yards a spring lever-pole is used to assist the men in raising the rods. Of late years a great impetus has been given to the use of bore-holes by the oil springs of America, where they are put down by hundreds and thousands, and where, although many experiments have been tried, the arrangements remain about the same as those in vogue in Europe. As these oil wells are not generally carried to great depths the spring-pole is ordinarily used. One end of a well-chosen tapering pole of some tough and yet elastic wood is strongly pinned to a foundation, and then having a fulcrum varying according to the length of the pole and the depth of the hole, the rods are attached to the thinner extremity, and the spring lifts their weight while the bore-master directs the stroke. In this way the men with ease manage the weight which at a depth of 100 yards is considerable. After the chisel or borer has been at work for some time it becomes necessary to clear out the hole. To a great extent this is done by means of water, of which the hole is full, and when it rushes up a great deal of the detritus is floated away. There will, sooner or later, come a time when the material at the bottom must be removed, and for that purpose the rods must be drawn out. To facilitate this operation a tower, or shears, or a triangle is erected at the surface; a couple of strong blocks of wood are placed across, and the rods raised to just below the first joint. The rod is then held by its projections, and the joint unscrewed. The piece removed is then carefully put aside, and the rods raised again to below another joint. It is again unscrewed, and the second piece, and also the third and fourth, and so on till all are removed, are placed in regular order at the side, so that they may be replaced exactly as before. In this way the boring-tool is brought up to the surface, and a sludger is let down. This is a tube of sheet-iron with a valve at the bottom, and being twisted round the broken material is pushed up the tube, and its weight closes the valve when it is drawn up, and brings the rubbish to the surface. Fortunately, there is a great tendency in the material to exercise a sort of suction on the valve. Ropes are often used to lower the sludger rather than the rods in order to save time, but this must be regulated by the nature of the material. When the hole has been cleared the boring tool is returned, the rods having to be screwed together length by length. Sometimes some material or a stone from the side will fall out upon the top of the boring-tool, and great force is often necessary to free the tool, in applying which the rods may break. Sometimes the rods themselves, from the violent vibration to which they are exposed, deteriorate in the quality of their iron, and break while at work. In these cases a number of most ingenious tools are brought into play to get hold of the broken fragment. One of the most useful of these is called "the crow's-foot," which being put down, and dextrously managed gets below the broken joint, and then being turned round by the bore-master, catches against the joint, and brings up the detached portion of the rods, and the cutting tool. Another is a conical hollow screw, which cuts into the softer iron of the rods, and so gains a hold by which the lost portions may be cautiously raised to the surface. [Mr. Smyth exhibited a large variety of these tools, as well as of "bits," rods, and the other apparatus.]

Besides the spring-pole, another method of raising the cutter for the blow in use at small depths is that of having the boring-tool attached to a rope passed round a windlass by one or two turns. One man turns the windlass, and raises the tool to a given height, when another man who holds the slack of the rope lets it go, and the blow is thus given. This is a method a good deal used in the neighbourhood of London for the purpose of shallow boring, but it is said to destroy the rope very rapidly. It is but little used in mining districts, where the spring-pole is invariably preferred in the earlier working of a bore-hole. Of course, when deeper lengths have been reached other devices have to be called in, and recently great advantage has been derived from the employment of steam.

CHESTERFIELD AND DERBYSHIRE INSTITUTE OF MINING, CIVIL, AND MECHANICAL ENGINEERS.

THE STEPHENSON MEMORIAL HALL.

A general meeting of the members of this Institute was held in the Assembly Room, Market Hall, Chesterfield, on Saturday, when there was a very good attendance of members, including the President (Lord Edward Cavendish), Captain the Hon. F. Egerton, M.P., the Hon. H. Strutt, M.P., Mr. C. Binns, Mr. T. Evans, Her Majesty's Inspector of Mines, Mr. A. Barnes, Captain Jeudwine, Captain Jackson, Mr. W. Fowler, Mr. R. T. Gratton, Mr. J. Brown, &c.

The PRESIDENT, in opening the proceedings, congratulated the members on the success they had already attained, and announced that the secretary had received a letter from his (the President's) father, His Grace the Duke of Devonshire, stating that he should be most happy to become a member and patron, and enclosing a cheque for 25 guineas. (Loud applause).

Mr. W. F. HOWARD (the secretary) here read the minutes of the previous meeting, and remarked that 21 new members had just been admitted.

HYDRAULIC ENGINES.—A very able discussion took place on Mr. E. Bromley's paper on hydraulic engines, Messrs. Howe, Ward, and Bromley being the principal speakers, and at the conclusion the usual vote of thanks was accorded the writer of the paper.

THE GUIBAL FAN EXPERIMENTS.—The discussion upon the above subject, which was submitted to the members in a very able manner by Mr. Robt. Howe, was next proceeded with, the writer and Messrs. Evans (the Government Inspector), Morison, Waddle, Houlton, and Howard being the speakers. At the conclusion, the PRESIDENT suggested that as the subject was of such vast importance, and as the members had not been supplied with the paper more than three or four days, it should be adjourned.

COAL WASHING.—A very able and exhaustive paper, by Mr. J. A. Birkbeck, "On Machinery for Washing and Separating Coal and Mineral Ores," was next read, the same being illustrated by diagrams of machines made by Mr. Morison, Messrs. Green and Bell, and those now in use at the Sheepbridge Works, designed and patented by Mr. Birkbeck. The discussion on the subject was adjourned, and a vote of thanks was cordially awarded the writer.

THE STEPHENSON MEMORIAL HALL.—The report of the Council to the last general meeting relating to the proposed Stephenson Memorial Hall having been read by the Secretary,

Mr. C. BINNS then said: My Lords and Gentlemen,—The joint Council of this and the Mechanics' Institutes, which are both interested in the erection of a Memorial Hall, have asked me to address a few words upon the subject prior to proceeding further in the matter. The whole question, I may say, is one of the deepest interest to those living in Chesterfield, who have any desire for the prosperity of the town in the future, and especially from an educational point of view. If we look around Chesterfield and see the large works springing up in every direction—as Sheepbridge, Staveley, and other places—we cannot fail to notice that the time is approaching when a rapidly-increasing population will settle itself down in this town, and that Chesterfield must become the great metropolis of the eastern division; particularly so must our reflecting men have their convictions aroused that something must be done for the training up of that population to know something more of the necessary details for carrying out the various improvements at the pits and works. In the town of Chesterfield there is no building whatever devoted to such purposes—there is no place where a scientific association can meet without running about to hire a room, and that could only be done at great cost. Now, this is a great hindrance to the progress of that knowledge which is necessary to a mining district. You want a focus where they can meet for carrying on discussion. Chesterfield is, I should think, the only place in England where there is so large a population which has no building devoted to such purposes, and it must rest undoubtedly to a great extent with that population to erect a building for carrying out the views of the joint council in order to make it successful, and to accomplish this success the institution must be free. (Applause.) The object which the Council has in view is to build a memorial hall to the honour of George Stephenson, who lived near to this town for a number of years, and whose remains lie buried in one of its churches. No man ever lived more deserving a memorial than George Stephenson. No man's efforts have been so productive as his, and there is no man who, during his life, more fully desired to see that class with which he was originally connected raised up in the scale of society; therefore, I say a public hall built in Chesterfield would be highly honoured if it had only associated with it the name of George Stephenson. (Applause.) A further question is, whether it is not essential in a town like this that you should have a building devoted to educational and scientific purposes? I will give you the names of a few societies which have no place to meet in—our own Mechanics' Institute, the Working Men's Club, and the Volunteers, except this room, for which you have to pay heavily. You have not a library worth sixpence. You have no museum, you have no place in which you can meet for literary or scientific instruction—in fact, you have no place at all (applause). The town has expressed its desire at several meetings to establish a large building for this purpose, and the Council is quite prepared to do their utmost to carry it out. We shall, however, expect large subscriptions from various sources, and the town of Chesterfield can and must do its duty in working out such an effort. It is no slight work the Council has undertaken: it will be laborious, and the gentlemen of Chesterfield will have to put their hands into their pockets, and consider that they are not giving for the present time, but for the purpose of promoting the future welfare of the town and neighbourhood. The speaker then concluded by stating that, after due consideration, the Council had come to the conclusion that, as the town was now making an effort to extend the accommodation at the hospital, and that by proceeding with their scheme now might hinder the subscriptions for that purpose, they had thought it would be better to let the matter rest for twelve months, when the hospital scheme would be completed. He hoped, however, when the matter came up again, as it undoubtedly would, that the people of Chesterfield would put their shoulder to the wheel, and erect a building which would not only be an ornament to the town, but a lasting memorial to the memory of that great man, George Stephenson. (Loud applause.)

The question of adjournment was then put to the meeting, and carried unanimously.

The Hon. H. STRUTT, M.P., in proposing a vote of thanks to the President, apologised for his inability to be present at the opening, but said it gave him great pleasure to learn that the society, having for its object instruction and scientific research, was making such satisfactory progress. With respect to the Stephenson Memorial Hall, the hon. gentleman said he agreed with Mr. Binns that Chesterfield was in want of some such building, and undoubtedly there was no name which Chesterfield would feel more pride in associating with the building than that of George Stephenson—a name known throughout the civilised world as the pioneer of the immense progress made in that particular branch in which he was engaged. Under the circumstances he thought it was wise to postpone the matter for another year. The hon. gentleman concluded by stating that he should be most happy to take any part in promoting the success of the institution—an institution which must prove of immense advantage to the neighbourhood.

Captain EGERTON, M.P., briefly seconded the vote of thanks, which was carried unanimously, and the President having acknowledged the compliment, the meeting separated.

PROPOSED GOVERNMENT MINING LEGISLATION.

At the National Trades Congress, at Nottingham, on Wednesday Mr. MCDONALD, agent of the National Association of Miners, introduced the question of the Regulation of Mines. He said the legislation in reference to mines might be traced from the year 1412 to the present time. For long after the black man could not touch these shores without becoming a free man the colliers and miners were still really slaves. After giving specimens of the astounding legislation of those days, he said that now if a child of 10 years of age could read and write he could be taken into the mine on Jan. 1 and keep there to the last day of December, or until he had reached the age when he could rebel against his father or employer. Such a state of things was a disgrace to the civilisation of England. Nor was it their fault that it continued to exist. They had spent 40,000*l.* since he had been connected with the mining industry in trying to remedy these things. Men would not do that without having good reason for being in earnest. (Hear, hear.) They now asked that their children should be prohibited from entering a mine until 11 years of age, that from 12 to 16 they should only work eight hours a-day, and that they should have 10 hours of school during the week. (Cheers.) These, he submitted, were not unreasonable requests. They asked the Congress to join them in presenting a petition from that Congress to the Prime Minister and the Home Secretary to put down this damning sin of England. (Loud cheers.) Now, with respect to the safety of the miners' lives, it was not only the periodical slaughters which shook the heart of humanity to its centre of which they had to complain, there was a Juggernaut of neglect and destruction rolling right on through the mining industry from day to day, causing preventable death to 50, 60, or more men weekly. (Hear.) They proposed that this should be changed by the increase of Inspectors of mines. (Hear.) There were 50 Inspectors of factories and only 12 of mines, representing at least 6000 pits. How could safety be insured with such inadequate means? ("No.") He concluded a speech, in which he powerfully recited the special hardships of miners, by asking the Congress to assist them in applying to Parliament.

Mr. HALLIDAY, alluding to the recent terrible accidents in mines, said they had been told by Government that it was not the duty of Inspectors of mines to enter the mines until after an explosion, but how could Inspectors prevent accidents but by examining the mines and seeing if they were safe, and if not prosecuting the offenders? (Cheers.) A common policeman could do what the Government talked of. (Hear, hear.)

Mr. APPLEGARTH moved—"That in the opinion of this meeting the lives of the mining population have been, and continue to be, needlessly sacrificed by legislation being delayed and put off from time to time, and that while committees are enquiring into matters of far less importance widows and orphans are increasing in numbers yearly through causes entirely preventable; and this meeting is further of opinion that no excuse for further delay ought to be tolerated." He knew something of the dangers of miners, and it behoved the Congress to support them in bringing about satisfactory legislation.

Mr. GEORGE POTTER briefly seconded the resolution, asking them to urge upon Members of Parliament the absolute necessity of legislating at once on the subject.—The resolution was then put, and carried.

Mr. KANE proposed, and Mr. HOWELL seconded, the following resolution:—"That this Congress agrees to sign a memorial addressed to the Prime Minister and Home Secretary demanding that parliamentary action shall no longer be delayed, and that we give a hearty pledge to aid this movement in any manner indicated by the Miners' National Council."—The resolution was carried.

DISCOVERY OF TIN IN NEW SOUTH WALES.

At the Geological Society of London meeting, on Dec. 20, a communication was read which had been forwarded from G. Milner Stephen, F.G.S., to the late Sir Roderick Murchison, dated Sydney, Oct. 5, 1871, announcing the discovery of a rich auriferous deposit on the banks of the river Bondé, on the north-east coast of New Caledonia, and of a great deposit of tin ore in the district of New England, New South Wales. The gold in New Caledonia is found in drift, and there are indications of the near proximity of a quartz-reef. The tin ore in New South Wales is said to be in "pepitas, crystals, and beds of conglomerate, especially in micaceous granite, more or less decomposed."

Mr. D. FORBES stated that in 1859 he had placed in his hands some specimens of granite from the district the discovery of tin in which was announced by Mr. Stephen, and that he found them to be perfectly identical with the stanniferous granites of Cornwall, Spain, Portugal, Bolivia, Peru, and Malacca, which he had also examined. These granites were all composed of white orthoclase felspar, colourless or black Muscovite mica, and quartz. He was not aware that tinstone (cassiterite or oxide of tin) occurred anywhere in rock of a different character. It was always accompanied by more or less native gold.

Mr. PATTISON remarked that in many places where tin occurred it was not present in sufficient quantity to be remuneratively worked.

Mr. D. FORBES, in answer to a question from Prof. Ramsay, stated that, as far as could be ascertained, the age of the stanniferous granites mentioned by him must be between the end of the Silurian and the early part of the Carboniferous period.

Prof. RAMSAY would carry them down to the close of the Carboniferous period, and would be contented to term them pre-Permian.

THE DISCOVERY OF TIN IN NEW SOUTH WALES.

The Elmore Mine is the nearest to Inverell, and is situated upon the right bank of the M'Intyre. The proprietors, Messrs. Brown, Barron, and Austen, have taken up, we are told, 800 acres of land, and it is said their boundary stretches for three miles along the river. They have cut a race from the river right up the steep face of the hill, where the ground sluicing is to be carried on so soon as the preliminary arrangements are completed. We saw their steam-engine upon the river bank, with a stock of firewood stacked ready for use. As there was no washing going on we did not visit this mine, but crossed the M'Intyre at the lower boundary on to Mr. Swanson and party's ground, directly opposite the last named. Messrs. Ross, Kerr, and Geggie's land is upon the same bank of the M'Intyre, and almost adjoins the Elmore Mine. It is believed to be very rich in tin, and we had evidence enough before leaving that it must be so. In passing along we found gum, appletree, and stringy-bark to predominate; it is said, indeed, that tin has not yet been found in box-bearing country. The soil about is of a whitish cast, like that of pipe-clay, and is largely impregnated with fine white drift sand. The prevailing rock is a mixture of granite and quartz. It is curious to see the way in which these two have been fused up together, and crop over the surface in dome-shaped boulders. At the upper frontage angle of the claim we saw some men at work, and made towards them. Mr. Ross's partners and one hired man were sluicing in the bed of the river, amid a cool brake of swamp-oak, a party of idle swag men, with their blankets—red, white, and blue—slung athwart their brawny shoulders, looking solemnly on the while. Here the bed of the stream is studded with large granite rocks, and a temporary drain, stretching from one to the other, has been carried across the river, leaving a small space for a by-wash. One end of a series of graduated sluice-boxes was fixed in an opening in the dam, through which the current might pass, and carry off the sand, stones, and earth to the tail of the sluice, leaving behind the ore which, by its own gravity, remains inert at the bottom of the frame. The material we saw operated upon was being carted from about 200 yards distance, and was yielding very satisfactory results, although by no means from the best ground.

As already stated, there were but three men at work—one carting, one feeding the sluice, and the other plying the sluicing fork—yet they had in a few hours, upon the previous day, washed out 50 lbs. weight of clean ore. When the many little hindrances and disarrangements that attend a commencement are taken into account, such results must be admitted as promising indeed. Our visit lasted for about two hours, and during that time the sluice-box was twice emptied of its contents, the gross yield netting, we should say, fully 40 lbs. Mr. Kerr is an old gold miner, and wields the sluicing fork with all the dexterity of an adept. He had by him a large sheet of bark, upon which was accumulated a heap of stones, of almost every shape, colour, and size. This heap he kept ever and anon increasing from out the sluice-box. Upon an examination of them we found, not a little to our astonishment, that they were one and all impregnated with tin ore; some of them, indeed, might more correctly be said to be tin ore impregnated with quartz, granite, and burnt clay than the reverse.

We next passed on to inspect the ground more minutely. A quartz vein, or rather a quartz and granite reef, stretches along the whole length of this company's ground transversely, like the diagonal of a parallelogram. It is a continuation of the same that traverses what is now pretty well known as the Elmore Mine. We could trace tin upon the surface as far as we went along it, and for some distance on either hand. Upon an examination of the reef and lateral spurs the ore may be easily observed in both the stone and the soil about it, the prisms of tin here and there sitting thickly in, and amalgamated with the indurated rock, and diversifying its surface with jet-black spangles. Before leaving we tried a small prospect on our own account. Having procured from one of the men a small dish, about half the size of a digger's ordinary prospecting pan, we filled it with soil from a fancy spot, but without any surface indications, and were rewarded, after a few shakes in the stream, with from 5 to 7 ozs. of tin ore—not so bad for novices. We were kindly invited by Messrs. Kerr and Geggie, the resident partners, to help ourselves to any specimens we might take a liking to; and it may be presumed that, if hungry on the way home it was not for the lack of "plenty of tin" in our pockets. It is intended to have another set of sluice-boxes at work in a few days, but this mode

of washing will shortly be superseded by a steam-engine, which we learn Mr. Ross is having fitted up for ground sluicing on an extensive scale.

It seems that between 3000 and 4000 acres have been taken up in this locality for mining purposes alone; but without access to the Lands offices of both Sydney and Inverell it would be impossible, just yet, to enumerate the names of the seemingly fortunate individuals concerned.

—Correspondent of *Inverell Courier*.

FOREIGN MINING AND METALLURGY.

The ironmasters of Belgium, as well as the colliery proprietors, are complaining of the insufficiency of means of transport, the impossibility of procuring raw materials, such as coal, coke, minerals, and pig, presenting an almost insuperable obstacle to the development of industry. Nevertheless, from all sides, and in all the forges and rolling-mills, orders are flowing in in great numbers. A good profitable season is by consequence anticipated. Official tables have appeared in illustration of the commerce of Belgium with foreign countries in the first nine months of 1871. It appears that the imports of minerals and limailles into Belgium amounted in September, 1871, to 55,084 tons, against 29,475 tons in September, 1870; the aggregate imports for the first nine months of last year presented, however, a decrease of 2000 tons as compared with the corresponding period of 1870. Of rough pig and old iron the imports in September were 14,949 tons, against 9377 tons in September, 1870; in the first nine months of last year the aggregate imports were 68,205 tons, against 68,097 tons in the corresponding period of 1870. The whole of the imports of iron of all descriptions other than minerals and limailles amounted in September to 15,645 tons, against 9890 tons in September, 1870. The aggregate imports of the first nine months of last year amounted to 73,591 tons, against 75,433 tons in the corresponding period of 1870. The exports of minerals and limailles from Belgium in September amounted to 12,333 tons, against 9338 tons in the corresponding period of 1870; and in the first nine months of this year to 128,150 tons, against 136,734 tons in the corresponding period of 1870. Rough pig and old iron was exported in September to the extent of 6180 tons, against 306 tons in September, 1870; and in the first nine months of last year to the extent of 29,686 tons, against 5361 tons in the corresponding period of 1870. The exports of rails from Belgium show a large decrease, having only amounted in September to 4943 tons, against 12,643 tons in September, 1870; and in the first nine months of last year to 64,574 tons, against 106,532 tons in the corresponding period of 1870. Of all descriptions of iron other than minerals and limailles the exports of September were 19,490 tons, against 23,231 tons in September, 1870; the aggregate exports for the first nine months of last year were 184,886 tons, against 202,049 tons in the corresponding period of 1870, showing a falling off of 17,263 tons.

The report presented by the directors of the Austro-Belgian Metallurgical Company shows that the company's undertaking was affected last year very much by the war and the growing dearness of raw material. The first was only a temporary misfortune, but the second must be regarded as a permanent evil. No profit appears, upon the whole, to have been realised by the company during its last exercise.

The new year has opened under favourable circumstances for the French iron trade. All the markets display considerable firmness, and the production, however extensively it may have been developed, is quite powerless to provide for current requirements. Notwithstanding these hopeful conditions some works are quite inactive, while others are working only partially, as in consequence of transport difficulties raw materials, such as minerals, coal, and pig, make default to a surprising extent, while it is in vain that the most pressing applications are made to the railway companies to induce them to furnish more rolling stock. Nevertheless, new works are being everywhere constructed. Thus the establishment may be mentioned at Hirson of an extensive foundry, with a capital of 40,000*l.*, and of a new metallurgical company at Hautmont under the style and title of Michel Helson and Company. This last-named company is understood to be almost entirely composed of Belgian industrials and capitalists; one of the parties most largely interested in the affair is M. Auguste Mineur, a forgemaster, at Lodelinsart. Prices in France are now as follows:—Rolled iron from charcoal-made pig, 9*l.* 12s. to 9*l.* 16s. per ton; mixed ditto, 8*l.* 16s. to 9*l.* per ton; coke-made ditto, 8*l.* to 8*l.* 8s. per ton; machine charcoal ditto, 11*l.* 12s. to 11*l.* 16s. per ton; mixed ditto, 10*l.* to 10*l.* 8s. per ton; ditto coke-made, 9*l.* 4s. to 9*l.* 12s. per ton, according to the works. First class coke-made sheets have brought 9*l.* 12s. to 10*l.* per ton; ditto charcoal-made, 10*l.* 16s. to 11*l.* 4s. per ton.

The great question in Belgium for the coal trade, and it may also be said for commerce generally, continues to be the transport difficulty. Things have arrived at such a pass that the necessity for a prompt and energetic remedy is recognised by all the world. The question presents a certain urgency not only in Belgium, but also in Germany, in France, and even in England. In France the Minister of Public Works has called upon a parliamentary committee to adopt as promptly as possible such a decision as may satisfy the general wants of commerce; the committee, it may be remarked, had been appointed to enquire into the whole question of railway management; the powers of the committee are of the most extensive and summary character. In Germany the pressure of public opinion has had a similar result, thus a public parliamentary enquiry is to take place in the course of this month into the general question of irregularities in railway traffic. The German commission of enquiry is composed of fifteen members of the Federal Parliament, five railway delegates, five agricultural delegates, and five delegates of commerce and industry. The commission will propose a federal *projet de loi* on the organisation and working of railways, and the Federal Chancellor has declared himself ready to examine it. The Belgian Government is about to let contracts for 400 coal trucks and 400 coke wagons. Prices of coal are maintained in Belgium with great firmness. The imports of coal into Belgium in September comprised 19,244 tons, and in the first nine months of last year 148,067 tons, against 168,839 tons in the corresponding period of 1870, and 176,872 tons in the corresponding period of 1869. The exports of coal from Belgium in September amounted to 417,660 tons, against 143,996 tons in September, 1870; and in the first nine months of last year to 2,521,398 tons, against 2,769,446 tons in the corresponding period of 1870. The exports of coke from Belgium in September were 54,633 tons, against 37,325 tons in September, 1870; and in the first nine months of last year 351,449 tons, against 508,524 tons in the corresponding period of 1870.

Copper has brought about former rates on the continental metal markets. At Paris rough Chilian has made 89*l.*; ditto in ingots, 94*l.*; English tough cake, 94*l.*; and Corocoro minerals, pure standard, 90*l.* per ton. At Marseilles refined Chilian and Peruvian have made 86*l.* per ton. At Rotterdam, Drontheim has made 50 fls. to 52 fls. The Dutch tin markets appear to be supported only by the current consumptive demand, there being no margin for speculation. Disposeable Billiton is scarce in Holland. At Paris, Banca, delivered at Havre or Paris, has brought 160*l.* per ton; Straits, delivered at Havre or at Paris, 160*l.* per ton; and English, delivered at Havre or Rouen, 164*l.* per ton. French lead, delivered at Paris, has made at Paris 19*l.* 8s.; Spanish, delivered at Havre, 19*l.* 4s.; and English, delivered at Havre, 19*l.* 8s. per ton. The quotation at Paris for Silesian zinc, delivered at Havre, has been 20*l.* 16s. per ton.

GREENLAND METEORITES.—At the Geological Society of London a communication from Prof. A. E. Nordenshjöld, For. Corr. G.S., was read, in which the author stated that the masses of meteoric iron brought from Greenland by the recent Swedish expedition seem to have formed the principal masses of an enormous meteoric fall of Miocene date, extending over an area of some 200 miles. The iron appears to be free from silicates. Against its eruptive origin the author urges that when heated it evolves a great amount of gaseous matter, and that it contains imbedded particles of sulphide of iron, the mass itself being nearly free from sulphur. The masses are composed of meteoric nickeliferous cast and wrought iron, or of mixtures of the two: in the last case the Widmannstætten's figures are best developed. The author further noticed the various modes in which the iron occurs: 1, as meteorites; 2, filling cracks; 3, as breccil-form stones cemented with oxide and silicate of iron; and 4, in grains disseminated in the basalt. Mr. ROBERTS protested against the evolution of gaseous matter being considered as a proof of meteoric origin. Prof. RAMSAY reiterated his previously expressed opinion, that the masses of iron might be of telluric origin.

COPPER MINING ON YORKE PENINSULA, SOUTH AUSTRALIA.

The intelligence received by the last Australian mail from this prolific copper-bearing district indicates considerable activity in mining operations there. While the continuous and great rise in the price of copper during 1871 will have put large additional sums into the pockets of the fortunate possessors of shares in the Wallaroo, Moonta, and other important undertakings, it has not been without its influence in stimulating into greater activity some of the younger and struggling mines in that locality. In looking over our files of newspapers received by the last mail it is encouraging to English readers to find a mine owned by an English company participating in the generally favourable prospects of the mining industry on the Yorke Peninsular. The Kurilla Mine, which is the property of the Yorke Peninsula Mining Company here, has been long and perseveringly worked by its owners through many difficulties. In recent reports the mine has shown itself to be steadily improving, and Capt. Anthony, in the report sent home by the last mail, states that he had discovered and driven over as much as 16 fathoms of ore ground in the 25, west of Deeble's shaft, and seemed very anxious to sink upon this, and to make good returns from it. The present encouraging condition of the copper market, and the cheapness of money here, should render it a not very difficult matter to the shareholders to raise sufficient money for the purpose. Within the last few days a demand appears to have arisen for the shares, which for a long time had been entirely neglected, and practically unsaleable.

We quote the following from the *South Australian Register*:—

"YORKE PENINSULA.—The more seen of the Doora the better it is liked. There is ore in abundance near the surface and in the depths below; and as if to compensate for the increased difficulty of raising it, as depth is reached the richer it has yet become. Since an engine has been started that was put up by the energetic and speculative Wallaroo Mine proprietors, on an outside section of theirs where there are promising indications of ore, but the water was too heavy to allow operations in search to be continued unless the mine was pumped by steam. If a mine should be opened up on this section, as seems probable, one more will thus be added to our list, showing the wonderful mineral wealth of the district, and the immense and valuable field it offers for labour and the profitable expenditure of capital. At the Moonta Mine there are no changes to report. The great mine—one of if not the most wonderful copper mine in the world—continues as rich as ever, and from the circumstance that it has been deemed advisable to increase the supply of labour, larger returns may be looked for. The Paramatta has, as we said it would, declared a dividend, and the mine is looking as well as ever it did. The most productive shaft is No. 5, which is turning out a splendid lot of ore. A new jigging-machine has been set in operation. From the Yelta large yields are reported, and it, too, will enable its proprietors to declare a dividend before any great period of time has elapsed. The prospects at the North Yelta are good, as also they are at the Kurilla. Another mining venture, the South Kurilla, is about to be energetically worked, so that, on the whole, we can report cheerfully and encouragingly of the Peninsula mining interest."

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PRACTICAL MINING LITERATURE.

The want of sound scientific knowledge has been much felt by the miners employed in developing the vast mineral resources of the western regions of the United States, and for this want the work* of Mr. J. S. PHILLIPS, M.E., of San Francisco, will prove an excellent remedy. The book is written expressly for the miners in the districts mentioned, and in addressing them Mr. Phillips remarks that the greatest mistakes in American mining have been caused by lack of ordinary prudence in a comparatively new and most difficult business. By commencing too much anew, inventing worthless machines and processes, in many instances reinventing such as had been tried at others expense, and abandoned. Instead he continues, of profiting by the experience of ages you have treated the worthy, legitimate, and practical with too much indifference, favoured the clean-fingered theorist, and, despising all practical rules, have discarded mining, played too much on metallurgy, too frequently lost your last dollar, and inflicted on mining a long lasting injury.

It is not pretended even to give an outline of the various sciences connected with mining, nor to convert miners into scientific men; but Mr. Phillips seeks to give them sufficient knowledge to enable them to help themselves in however unsettled a part of Western America they may be mining in; he would teach them something of geology to enable them to recognise a "true fissure vein" when they see it, or if they have not already been in the field, he would teach them how to explore and where to explore, with the best chances of success. A vein having been discovered, the next thing is to ascertain whether it is worth working; the author, therefore, gives a section on assaying and descrimination—that being, indeed, the leading feature in the volume. Mr. Phillips states that the original object of the book was to illustrate and explain the uses of his "Prospectors' Assaying Machine," which was invented to supply the urgent demands for a cheap and easy means for explorers to ascertain the value of ores with a sufficient degree of accuracy for all practical purposes not strictly commercial throughout the departments of mining and metallurgy. The work has now been extended to embrace the whole field of mining, which, he considers, is sufficiently hazardous at the best, having too many blanks for a prize, to sustain unnecessary errors arising from insufficient preliminary examination—as most deplorably evinced by retrospecting the legion of mills that have been erected on hundreds of ledges, but as enormously expensive assaying machines to prove their worthlessness: his apparatus would, he claims, have exposed the demerits of such ledges at a most trifling cost and in much less time.

Referring to the necessary qualifications of a mining engineer, which Mr. Phillips fixes at an unusually high standard, he observes that nothing can be more antagonistic to the real advance of mining interests than those twin bane, the ever-sanguine unscrupulous "market miner" and the clean-fingered, kid-gloved, learian notioned, fully graduated "college expert;" for the former, under the exonerating fosterage of swindling stock jobbers, by his shrewdly concocted mythic reports, sustains worthless mines, whilst the latter, insanely patronised by monied stockholders (a mere theoretical embryo of what a mining engineer should be), presumptuously engages to superintend the most difficult operations of this pre-eminently extensive avocation, where all must be conducted according to the practices of tradesmen who have been educated by a life experience for the particular business. These subordinates having to do the real duties of mining, will despise the mere scientist as manager who lacks these imperatively necessary practical qualifications; the miner will bamboozle him at every turn in the intricate and dangerous ramifications of mining; the timberman having the exact length of his feet will yoke them with a pair of lamb's legs, which the pitman will fasten with a German key; the carpenter will fix his hands in the bench screw until he cries enough; when the blacksmith should lead him by the nose with red hot tongs, of the ground so consecrated by practice: and the millier will derisively follow in his work as he pelts him with slimy pulp; thus he will be at the mercy of every practically efficient squeeze until the professor has learned that one ounce of practice is worth a two thousand pound ton of theory in such a place; and that for such a purpose theory but takes notes, whilst practice leads the way to success.

Metallurgy, which is treated of in the concluding section, and embraces descriptions of roasting, milling, ch

FOREIGN MINES.

SIERRA BUTTES (Gold).—The result of "the clean up" for the month of Dec., 1871, is as follows:—Receipts, $39,385; 2431 tons of ore were crushed during the month; cost of mining and milling same at $5·14½ per ton —$12,507·50. The supply of water is now abundant.

BIRDSEYE CREEK (Gold).—J. A. Stone, Dec. 15: Water: There is about 100 in. coming in the ditch, which I catch in the reservoirs until full, then use it on on the Neece and West claim; by so doing I get about five hours washing each day. The rains are unusually late, but I think we will yet have a good supply of water.—Neece and West Tunnel: The rock continues about the same as when I last wrote you. I do not know just the exact distance it is now driven, but will tell you in my next.

JAVALI.—The directors are in receipt of advices by the West India mail up to Dec. 5. The following are extracts from Capt. Johns' report:—A good deal of work has been done. Pim's tunnel has been driven 5½ varas; Pollock's tunnel has been driven 27 varas, yielding quartz at an average of 8 dwts. per ton; Dolores shaft has been driven 14⅓ varas, at an average of 6 dwts. per ton; 5⅔ varas have been driven up in Socorro, which yielded ⅛ oz. per ton. The stope on the surface has yielded 696 car loads, equal to 332 tons, of quartz, at an average of 8 dwts. I have driven in Socorro in No. 2 level, on the cross-cut, for the purpose of ascertaining the width of the lode, and to my astonishment found it to be 20 yards, and only containing a small piece of lead ground in the middle, 1 ft. wide. On the surface we have reached the place mentioned in my last report, and the results show an average of 9 dwts. 2 grs. per ton against 7 dwts. last month. The mill had worked 20 days, and crushed 904 tons, yielding 410 ozs. of gold. We lost four days in casting new bearings; if this had not been necessary we should have nearly 100 ozs. more; this leaves a profit of 20£ on the month's work. Health is good, and labour sufficient, hoping to send you next month a remittance better than any before.

CHONTALES CONSOLIDATED.—John Tonkin, Wm. Evans, Daniel Tonkin, Dec. 5: Report for November: San Antonio Mine: The stope in back of No. 5 level has been stoped 52 varas; the lode is 2 ft. wide, worth 6 dwts. of gold per ton. The No. 1 stope in the back of the level west of eastern cross-cut has been stoped 34 varas; lode 3 ft. wide, worth 4 dwts. of gold per ton. No. 2 stope, in back of the same level, east and west of the eastern cross-cut, has been stoped 66 varas; lode 4 ft. wide, worth 5 dwts. of gold per ton. A stope in the back of Connection level has been stoped 10 varas; lode 2 ft. wide, worth 8 dwts. of gold per ton.—San Sebastian Mine: The level has been driven east on the course of the lode 26½ varas; lode 4 ft. wide, worth 3 dwts. of gold per ton. We are pushing on the tramway with all speed, and have half of the timber necessary for making the bridge on the spot.—East San Benito Mine: No. 3 level has been driven east on the course of the lode 22½ varas; lode 2 ft. wide, yielding a little gold, but not sufficient to value. No. 2 level has been driven east on the course of the lode 12 varas, which is 6 ft. wide, and worth 10 dwts. of gold per ton for the first 5 varas, and at present is about 3 ft. wide, worth 4 dwts. of gold per ton. The rise has been put up in the back of this level on the south part of the lode 5¾ varas, which is about 5 ft. wide, and worth about 10 dwts. of gold per ton. We have also stoped 38 varas in the back of the above level, worth 15 dwts. of gold per ton. The rise in back of No. 2 level has been put to surface; lode about 6 ft. wide, worth 3 dwts. of gold per ton. No. 2 level has been driven west 4¼ varas; lode 4 ft. wide, worth 3 dwts. of gold per ton. No. 1 level has been driven 11¾ varas; lode about 3 ft. wide, worth 4 dwts. of gold per ton. We have stoped 41½ varas in the back of No. 1 level, west of No. 2 rise; lode 4 ft. wide, worth 6 dwts. of gold per ton; also stoped 25½ varas east of No. 1 rise, worth about 4 dwts. of gold per ton. The number of tons sent to the stamps was as follows:—From San Antonio, 516 tons, yielding 4¼ dwts. per ton; from East San Benito, 829 tons, yielding 7½ dwts. per ton: in all, 1345 tons, = 426·600 ozs. melted gold.

Mr. Belt, Dec. 5.—Gold returned for November, 426 ozs., from 1345 tons of ore; average produce, 6¼ dwts. per ton; value, 1194l. Cost for the month, 1346l., which includes the sum of 228l. expended on capital account. Mr. Belt writes—San Benito East: In our levels Nos. 1 and 2, driving east, the lode is now much smaller, being 3 ft. in the former and 6 ft. in the latter level. I believe this to be only a temporary nip in the lode, and that we shall soon get into wider and better ground. The stopes above No. 2 level have yielded ore valued at 15 and 10 dwts. per ton. The lode is from 13 to 17 ft. wide, and as both it and the country are very soft we have only been able to take out about one-half its width in the first stope. When we finish this we shall fill it with clay, and take out the other side. There is a hard band of quartz on the southern side of the lode, which made it difficult to stope there first; and as the very rich nail was also on that side we have not yet stoped any of it below No. 1 level. The health of the establishment continues good.

UNITED MEXICAN.—Extracts of despatch from Mr. Edward Hay, dated Guanaxuato, Nov. 24: Mine of Jesus Maria y Jose: The pozo in the boundary line in San Pantaleon continues promising; some good ore in small quantities has been extracted from this point, but to all appearances the ore is giving out to the north, while it seems to promise some yield to the south. In the other parts of the mine nothing worth mentioning has taken place, and on the whole the yield is still sufficient for the wants of the haciendas. The accounts for the month of October show a profit of $456.—Mine of Remedios: The ore in the frente of San Pedro north has decreased in value, but the body of the available ore in the lode has increased in breadth, and the yield has been larger than last month. In San Crescencia north the ore seems to give out. The greater part of the carga is got from the stopes of the San Cristobal and the Ascencion, and hopes are entertained that they will continue for some time in this favourable condition. The accounts for the month of October show a profit of $5028, of which the company's share amounted to $2933.

New Concern—Adit of San Cayetano: The lower part of the end we are driving west, for the continuation of the adit in the Buenos Ayres ground has changed completely. The stuff we went through consisted of whitish steatite, with a speckled blue pinta, but it contained no silver. After a couple of days we came on a strong and well-defined reliz of a contra natural vein, and the wall traversed; the ground became so soft that in one week, ending Nov. 18, we drove 4½ varas, and reached the lower wall of the lode in the same well-defined condition as the upper wall. The vein consisted of steatite (soap-stone), but of a dark blue colour; but, notwithstanding its promising look, no trace of silver was found in it. Since Nov. 18 we have again come to the hard rock, with slight stripe of quartz running through it, and with the other signs we observed about two months ago, before entering the ground that held out the above-mentioned hopeful appearance. In the cross-cut to the south no material change has taken place; we are driving through a series of strips of quartz, from which at times water is oozing ont.—Mine of San Antonia de la Ovigera: In the frente of Eladea the rock has become hard, and narrow relices (walls of the lode) continue to be met with.

ANGLO-ARGENTINE.—Capt. Joseph Vivian reports for October—Another instalment of amalgamating machinery has been delivered here, but unfortunately the main shafting and gear work of arrastres is still at Rosario. The shafting is the most important article wanting, as without it we cannot drive any of the amalgamating machinery. The deep adit in the Chairman Mine is extended to within a short distance of old workings. This mine is stated by the former workers to be very rich both for gold and silver. The lode will undoubtedly be intersected during the next month, when we shall be in a position to send from this point a large quantity of mineral to stamps at a small cost. In the North Mine the lode maintains its size and character, and presents the same favourable appearance without any new feature calling for comment.

CAPE (Copper).—The directors have received despatches per Roman. Reports on trial mines are received. They show material change. Bills of lading are received for 36 tons of regulus and 13 tons of ore per present steamer, for 38 tons of regulus and 23 tons of ore, per Saxon, s., and for 345 tons, per Lynwood (called November 23). Since last notice the following sales have been made by private contract—On December 23, 590 tons, ex Taena, at 17s. 2½d. per unit; and on the 3rd inst., 200 tons of regulus, ex steamers, at 17s. 3d. per unit (neither yet assayed).

PONTGIBAUD.—W. H. Rickard, Jan. 2: Roure Mine: The 80 metre level, south of Agnes' shaft, yields stones of ore. The 60, north on Virginie's lode, yields a little saving work, and the same level south ⅛ ton of ore per fm. The winze below the 40 has been holed to the rise from the 60 laying open a good piece of ground, worth from ⅛ to 1¼ ton of ore per fathom. We have set the 40 north and south; each end yields ⅛ ton per fathom. The 20 north, on the eastern part, yields a little saving work. The same level, on the main part, yields ⅛ ton of ore per fathom. The northern end of the adit gives ¾ ton per fathom, and the opposite end a little ore at times. The rise in the back of the adit north yields ⅛ ton per fathom. The stollen cross-cut, west towards the tin lode, at Argentelle, has met with a branch letting out a large stream of water, and containing much arsenical pyrites. The rise, south of Paul's shaft, is on the point of being holed to the intermediate level, which proves the ore discovered in that level to be cut off by a strong slide. At the mill adit south the lode has yielded some good stones of ore during the month, and we hope soon to have an improvement. The tribute pitch in the back yields 2 tons of ore per fathom. All the other pitches continue their usual yield.—La Grange Mine: The 100 metre level, north of Nosky's shaft, yields a little saving work. The rise behind this end has been holed to the 80 opening out a piece of ground workable on high tribute. Our tribute pitches yield a fair quantity of the usual quality orestuff.—Mioche: The 20 north has opened a little tribute ground. The tribute pitches yield some pretty good work.—La Brousse: The sinking of Bassel's shaft below the 120 metre level continues to go on rather slowly, the ground being hard. The 120 south yields a little saving work. The 100 south ⅛ ton per fathom, and the rise behind this end ¼ ton. The 80 south produces ⅛ ton, and the rise above ¾ ton per fathom. The 60 south is poor, but the lode where being cut out behind this end yields 2 tons per fathom. The tribute pitches continue, on the whole, to yield well.—Pranal: The 70 north, on St. Matthew's lode, yields ½ ton of ore per fathom; the same level south 1½ ton. and ditto, on western part, ½ ton. The 50 north is unproductive. The No. 4 winze at this level, just over the 70 north end, produces 1 ton per fathom. St. George's rise, at this level, is in stiff sparry ground. The 30 south is poor. The winze here on the eastern part of the lode yields ⅛ ton of ore per fathom. The 8 metre level, on western vein, yields stones of orey work. The 16 tribute pitches working yield from ¼ to 1 ton of ore per fathom each. The sinking of St. George's shaft goes on regularly.—Surface: Our outdoor work has been much hindered by the late cold, and the washings have suffered much from the same cause. The samplings have amounted to 143 tons.—St. Amant Mine: The 25 north and south of Susan's shaft, continues in a large kindly lode, producing stones of ore at intervals.—Labrugière Mine: The cross-cut at the Monlin adit level has intersected a small vein showing spots of ore, it is being continued to prove the veins still ahead.

LINARES.—Jan. 3: Pozo Ancho Mine: The lode is small and unproductive in the 85 west of Crosby's shaft. The lode in the 75, west of Crosby's shaft, is without lead at present, and the ground getting harder for driving. The lode in the 75, east of San Francisco shaft, is small, yielding stones of ore, worth ½ ton per fathom. In the 75, west of San Francisco shaft, the lode is regular, and has a kindly appearance, yielding 1 ton of ore per fathom. In the 65, west of San Francisco shaft, the ground is hard for driving, and the lode of no value. The lode in the 55, west of San Francisco shaft, continues very compact and regular, yielding ⅛ ton of ore per fathom. There is no improvement in the 45 east of San Francisco shaft. The tribute department yielded very well in the past month; unfortunately, some of the best places are getting very thin. The works at surface are going on very regularly, and the machinery is in excellent condition. We estimate the raisings for January at 200 tons.—Quinientos Mine: In the 65, west of Taylor's engine-shaft, the ground is very hard for driving through. The lode in the 55, west of Taylor's engine-shaft, has fallen off in value during the past week, yielding ¾ ton of ore per fathom. The lode in the 65, east of Taylor's engine-shaft, is small and unproductive. The lode in the 55, east of Taylor's engine-shaft, contains good stones of ore, but scarcely sufficient to value. The 45, east of Addis's, is a strong lode, with good stones of ore. The 32, east of Henty's shaft, is passing through a splendid shoot of ore, worth 5 tons per fathom. The 32, west of San Carlos shaft, is being driven to meet the last-named end, and will probably improve very shortly, producing 1 ton of ore per fathom. The lode in the 45, west of San Carlos shaft, is rather small at present, worth ¾ ton of ore per fathom. In the 55, west of San Carlos shaft, the lode is unproductive at present. The lode in the 55, east of San Carlos shaft, is very open and easy for driving, and yields large boulders of lead, worth ⅛ ton per fathom. The 45, east of San Carlos shaft, is a compact, strong, and well-defined lode, worth 4 tons of ore per fathom. The lode in the 32, east of Judd's shaft, is changeable, and produces occasional stones of ore, yielding ⅛ ton per fathom.—Shafts and Winzes: Carmona's winze, below the 55, is holed to the 65; lode small and poor at the point of communication. In Salvador's winze, below the 32, the lode is very small. The lode is large and spotted with lead in Perez' winze below the 32.

FORTUNA.—Jan. 13: Canada Incosa: The 110, driving west of Henty's shaft, has entered a good course of ore since last report; the lode is large, and letting out water freely, producing 2 tons of ore per fathom. The lode in the 100, west of Judd's, is large, and the ground easier for driving than it was, yielding 2 tons of ore per fathom. In the 80, east of Henty's cross-cut, the ground is exceedingly hard, and progress very slow. The driving of the 60, west of San Pedro's shaft, will be resumed shortly. The 90, east of Addis's, is in a hard channel of ore; the lode still retains its size. The lode in the 80, west of Lowndes's, is large and kindly, and opening out stoping ground, worth 1 ton per fathom. In the 80, east of Carro's, the lode is still much disordered by the influence of the cross-course.—Shafts and Winzes: Judd's shaft, below the 90, will be holed to the 100 shortly; the branch is gone off north. In Lowndes's shaft, below the 80, the cistern is fixed, and a good part of the pit-work sent down. The lode is not quite so productive as it has been in Serrano's winze below the 70, yielding 1½ ton per fathom.—Los Salidos Mine: The 110, west of Buenos Amigos shaft, has passed through a small cross-course since last report, producing ¾ ton of ore per fathom. Very little progress is being made in the 100, west of San Carlos shaft. In the 90, west of San Carlos shaft, the lode is small, containing a little lead, but not sufficient to value. The lode in the 75, west of San Carlos, is greatly diminished in value since our last. The lode in the 110, east of Buenos Amigos shaft, is large and kindly, and looking better than for time past, yielding 2 tons of ore per fathom. In the 110, east of Morris's engine-shaft, no change has taken place to notice. The 100, east of Cox's, will be communicated with San Pablos shaft shortly, yielding 2½ tons of ore per fathom; the lode is large and strong, and of a very promising character, yielding 3½ tons of ore per fathom. We have still two small branches in the 35, west of Palgrave's engine shaft, producing ⅛ ton of ore per fathom. In the 25, west of Palgrave's engine-shaft, the men are putting on a stope in the bottom of the level, producing ⅛ ton per fathom. In the 35, east of Palgrave's engine-shaft, the branches are small, and letting out a large quantity of water, yielding ⅛ ton of ore per fathom.—Shafts and Winzes: San Carlos shaft, below the 90, is communicated to the 100, and yielding 2 tons of ore per fathom. The lode is mixed and valueless in Jordan's winze, below the 100. The lode in Agustine's winze, below the 100, is small and compact, and the ground hard, yielding ⅛ ton of ore per fathom. In Medina's winze, below the 25, the lode is divided into small solid branches, producing 1 ton of ore per fm.

ALAMILLOS.—Jan. 3: The lode in the 60, west of San Rafael shaft, yields occasional stones of ore, worth ⅛ ton per fathom. The 60, east and west of San Francisco shaft, being unproductive, is stopped for the present, and the men put to stope some good ore ground east and west of Serrano's winze. In the 50, east of La Magdalena shaft, the ground is very hard, and the lode is small. The 75, east of Taylor's engine-shaft, continues unproductive. The lode is large and open in the 85, east of Taylor's engine-shaft, and is letting out a stream of water, producing ⅛ ton of ore per fathom. We have started the 85, west of Taylor's engine-shaft, in which the lode is large, and contains good stones of ore, yielding ⅛ ton per fm. The lode in the 50, west of San Adrianos cross-cut, is small and poor. In the 50, west of San Yago's shaft, the lode is improving, and will as it gets nearer Alejandro's winze become valuable. The 30, east of San Victor's shaft, is in contact with the main slide. The lode in the 40, north of San Victor's cross-cut, is very strong, and opening tribute ground, worth 1 ton of ore per fathom. The men are getting on well with the 50, south of San Victor's shaft. In the 20, east of Addis's shaft, the men are opening the north side to prove a part of the lode standing there. The 40, east of Crosby's shaft, is opening profitable ground, worth 1½ ton per fathom. The lode in the 50, east of Crosby's shaft, is changeable, and not so good as it was a few days since, now yielding ¾ ton per fathom. In the 50, east of Crosby's cross-cut, the ground is moderately easy for driving through, and the lode looks promising, worth 1 ton per fathom. The 50, west of Crosby's cross-cut, is opening a run of valuable ore ground, producing 2½ tons per fathom. A great length of profitable ground is being thrown open in the 40, west of Crosby's cross-cut, worth 1½ ton per fathom.—Shafts and Winzes: In Sebastian's winze, below the 40, the lode is small and regular, worth 1 ton per fathom. Rica's winze, below the 30, is going down in a very fine shoot of ore, worth 3 tons per fathom. The lode is again improved in Felipe's winze, below the 30, and we expect to hole it to the 40 this month, producing 2¼ tons of ore per fathom. We have put on some additional stopes, in order to keep up our usual monthly returns of ore. The works at surface are going on very regularly, and the machinery is in good condition. We estimate the raisings for January at 225 tons.

RHINE.—Jan. 9: Schmelzer: During December the 27 cross-cut was driven north 5 fms., but the side lode has not yet been intersected. Although the end has reached the vertical of that lode in the 17, and 1 fm. beyond, it seems doubtful whether the lode holds down. The side lode is an offshoot from the north lode, which is yet ahead; the latter should be intersected in about 2 fms. further driving. The ground is hard at present, and unfavourable for rapid progress, and the end is very wet. We are driving a short cross-cut westerly from the plat in the 27 towards the Toni lode, to prove the latter. The lode as seen in the shaft at the 27 is 4 ft. wide, quartzose, and containing blende and a little copper pyrites. The level is started from the plat instead of in the lode, to avoid interfering with the shaft.

LANESTOSA.—Jan. 5: The snow about the mines has entirely disappeared, and we are now doing full work at most of the places opened. The storms are generally heavy and sudden, but they do not last long, and with the moist climate and the heavy rains we have, a little time only is necessary to relieve us of the deepest snows.—Esperanza: The tribute pitch here remains without change, but it is probable that less calamine will be raised during January than December, as the men are driving on the bed southward to further prove it in that direction.—Augustina: Here Bascula shaft has been cleared up and timbered to 12 metres deep. A wooden house is now being put over it, that the men may continue the sinking day and night without hindrance, and as we have now a stock of the principal timber on hand it is to be hoped that good progress will be made; the sinking has been set at 200 rs. per metre. In about six months I hope to have the shaft and level at bottom cleared so as to reach the large deposit called 1st Cruzero, where, according to statements made, large quantities of calamine were left standing. The present price of zinc is a strong inducement for pushing these works vigorously.—Asuncion: Santa Tomas adit, as before reported, has been cleared to the end, the length in all being 116·70 metres. According to our dialling it lacks about 20 metres more to reach the main lode, and this will be driven as quickly as possible, a full pare of men being now employed. The cutting of this lode may be looked forward to with interest, as the level will intersect it under a point where the appearances are very favourable at surface. A pitch is being worked at Santa Matilua shaft, where a little lead will be raised at 4l. per ton.—Glanrafon: The ground here for the past month has been hard, and there being no shelter for the men but little progress has been made in the adit, but now a house has been put up, and the work will be followed constantly. The lode will most probably be cut during the present month, although at too shallow a depth to expect anything of value. It will require some six months to get under the hill, so as to fairly test the quality of the lode.—Santa Lucia: The inclined level at this place passed through some favourable ground early in the month, yielding good quality calamine and lead, but unfortunately a heavy landslip from the bank above stopped all work there, and it will take another week to clear this so as to resume the driving and stoping. There is every expectation of having some good paying ground here as the level is advanced.—Aurora: I am sorry to inform you that an accident occurred at the pitch in this mine yesterday. As the tributers were clearing out an old level to unwater the pitch, a fall of ground from the back buried one of the men, and he now lies in a very dangerous state, chiefly suffering from a blow on the lower part of the back. The pitch, in consequence of this, will probably not be worked for a little time. The cross-cut to western lode, from north shallow adit, is very hard, and as the men has not been able to follow the place regularly not much has been driven. It requires some 12 metres more to intersect the lode. At the Ania adit a small vein has been met with, which will most likely help the driving of this level considerably, whilst there is also a probability of something being met with on it in driving; but our object is to drive forth some 30 metres in firm ground, and then cross-cut to the main lode west.—La Flora: In the deep adit at this mine a lode has just been intersected, which I believe to be the one we have been driving to interset; very little can be seen of it yet, nor do we expect too meet with anything of value here, the point aimed at being some 20 metres further west, where there is a junction with another large lode.—La Luisa: At Ventura adit we are now in solid limestone, and on the eve of cutting what is called No. 2 lode; this is small at surface, and we shall probably push through it to cut the large lode some 25 metres further west, when driving will be commenced on its course towards the hill northwards. At Cubilio adit some troublesome ground has been passed through during the month, but it is now a little better; stones of lead continue to be found, but the end has not yet reached the unbroken ground, and until it does nothing of importance can be expected. The ground has been taken out for the house, stones raised, and the masons are now busily engaged in the building when the weather permits. When the work is done both the adits will be followed regularly. When we have better weather I hope to put some men at work raising calamine at one or two points, but very little can be done at this during the present season, when at most of the mines around us work is almost at a standstill.

PESTARENA UNITED (Gold).—Thomas Roberts: We consigned yesterday, to Signor C. Menozzi, 9047 grs. of gold (or 291 ozs. 0 dwt. 1 gr.), being the product from 543½ tons of ore. Of the above, 47 tons amalgamated at Pestarena gave 32 ozs. 3 dwts. 8 grs.; and 49½ tons amalgamated at Val Toppa Mine establishment gave 258 ozs. 16 dwts. 17 grs. We have had to contend with very cold weather, and a great quantity of ice in our water-course and about the water-wheels, which interfered with the speed of the mills during the past month.—Val Toppa: In the first cross-cut west (No. 3 level) we have reached another vein carrying pyrites. The second cross-cut west is suspended, and we are driving south on a lode last reached in the cross cut. The end driving south in this level, on the quartz lode, yields 10 tons per fathom, worth 7 dwts. per ton. The lode in the winze in this level yields 12 tons, at 12 dwts. The stopes on the side lode, east of main level, yields 7 tons, at 15 dwts. The intermediate end south, above No. 3, has been communicated to the winze from No. 2 level, and a new stope commenced in the bottom of level, worth 6 tons per fathom, at 15 dwts. —No. 2 Level: In a new end, north of 4th cross-cut, the lode yields 10 tons of ore per fathom. The stopes in back of No. 2, on the flat lode, have very much fallen off in value, and so have the stopes on this lode, in the bottom of the level. The winze sinking on the flat lode yields 10 tons per fathom, at 10 dwts. The No. 2 stopes, in the back, on new lode, give 12 tons, at 10 dwts. The stopes in the back, north of 3d cross-cut, 15 tons per fathom, at 9 dwts. per ton. The stopes north and south of winze, on the new lode, give 12 tons, at 12 dwts. The end south of the western part of the quartz lode, 6 tons, at 12 dwts. The winze in this level, 7 tons, at 10 dwts. The end driving south, on side lode west, in Zero level, yields 4 tons per fathom, at 10 dwts. per ton. Good progress is being made in opening the old Zero level.—Pesculera Mine: The 33 end driving north, on No. 5 lode, produced on an average for the past month 9 tons of ore per fm., at an estimated value of 10 dwts. per ton. The 46 end south, towards the old Pozzoni Mine, continues to yield good stones of ore. The 55 end north, 2 tons, at 12 dwts. per ton.—Acquavite Mine: The 23 end, driving south, has yielded on an average 3½ tons per fathom during the past month, at 10 dwts. per ton, and now yields 4 tons, at 12 dwts. The 23 north, 3 tons, at 11 dwts. The 33 end south, 1½ ton per fathom, at 8 dwts. The 33 north is poor. In the whim-shaft under the 33 we have put a borer-hole down, reaching an intermediate level, letting down the water, which will facilitate the future sinking of this shaft. Owing to the severe cold weather, nearly all the surface works are suspended.

VAL ANTIGORIA (Gold).—Thomas Roberts, Jan. 3: The incline shaft is now under the 30 fm. level 34 metres; at this point the lode has a more promising appearance; it is 2 ft. wide, composed of quartz and pyrites, yielding for amalgamation 2½ tons of ore per fathom. In the present month we hope to get the shaft down for a 40 fm. level. In February we intend sinking a reservoir in the bottom of the 40 fm. level, and commence driving north and south of incline, to open out a 40 fm. level, which to present appearance will be in productive ground. The lode in the 30 fm. level end south has been poor the whole of the past month; but during the last few days it has given some good stones of ore. The winze in the bottom of the 30 yields at present 1 ton of ore per fathom. No. 1 stope, in the back of the 30, has failed; No. 2 is yielding 3 tons of ore per fathom. We amalgamated in December month 45½ tons of ore, and produce 817 grammes of gold, equal to 26 ozs. 6 dwts., and have consigned the same to Sig. Carlo Menozzi.

[For remainder of Foreign Mines see to-day's Journal.]

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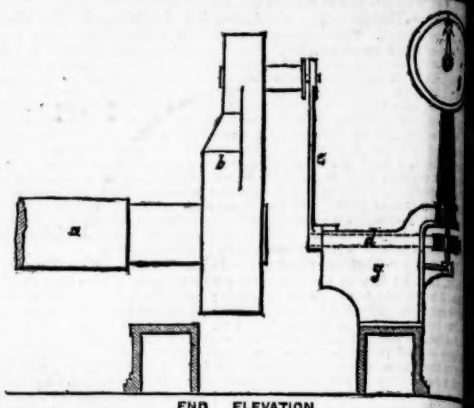

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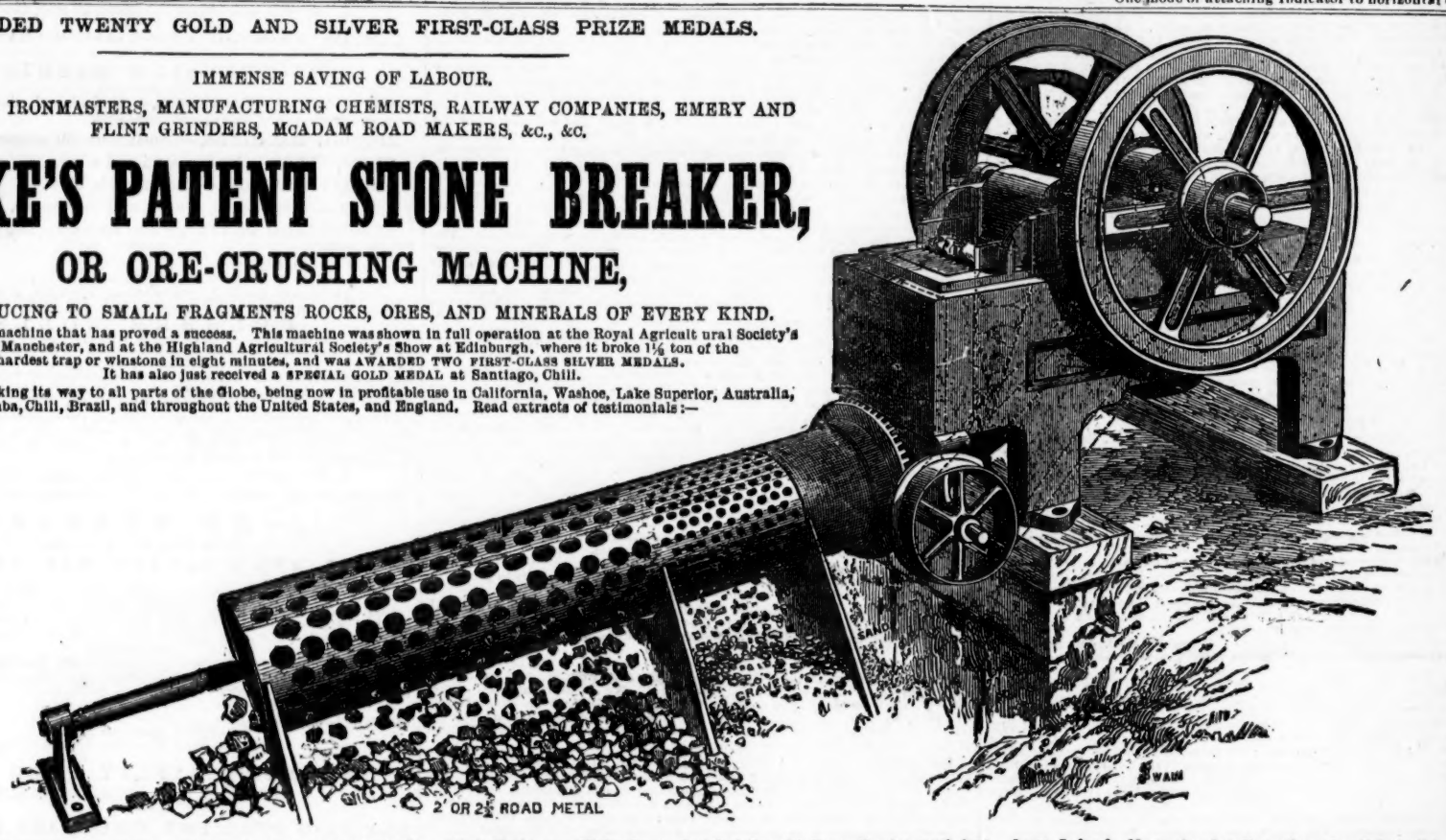

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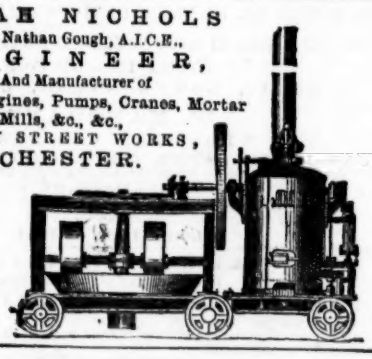

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